THE UNIVERSITY OF ALBERTA

# AN HISTORICAL GEOGRAPHY OF COAL MINING IN THE EDMONTON AREA

by

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "An Historical Geography of Coal Mining in the Edmonton Area" submitted by Sally Anne Hamilton in partial fulfilment of the requirements for the degree of Master of Arts.

Date ....August 25th 1977....

## ABSTRACT

The focus of this study has been the inter-relationship between the city of Edmonton and the coal mining industry which was carried on in and around the city during the early and middle years of its growth. Without the city there would have been no coal mining industry, or a much diminished one, because the city provided the major market for local coal producers. Without the coal mining industry, the city might not have prospered to the extent that it did. The coal mines provided valuable off-season employment and the value of the coal produced contributed materially to the city economy. Cheap coal made Edmonton a more attractive place to live in the winter than it would otherwise have been. No blessings are unmixed, and later residents of Edmonton have had reason in the shape of cracked foundations and broken water mains, to curse the gopher - like burrowings of the coal miners beneath the city. As the city continues to expand and undermined areas are subdivided, this problem will continue to exist, even though the industry which caused it is gone beyond recall.

A chronological approach was used throughout the study. A brief discussion of the origin and structure of the coal-bearing formations was followed by a discussion of the

establishment and growth of Edmonton, with particular emphasis on the parallel growth of the coal mining industry. The problems which developed in marketing Edmonton coal were treated in a separate chapter, as were the problems which developed when the growing city extended utilities services into mined out areas. Finally, the coal mining industry as it exists to-day on the fringe of the metropolitan area was examined in some detail as a guide to how the industry must have appeared at its peak.

The conclusion, that coal mining in the Edmonton District has no future if living conditions remain as they are, is inescapable. Coal mining has contributed an interesting and important chapter to the city's history.

ACKNOWLEDGMENTS

No study is ever solely the work of its author. I am deeply indebted to a number of people and organizations for making information available to me and for their encouragement. I would like to thank the Director and staff of the Mines Branch, Department of Mines and Minerals of the Province of Alberta, for giving me access to their files, the staff of the Archives of the Province of Alberta for their help in locating material and in particular for very prompt reproduction of photographs from the Ernest Brown Collection when time was of the essence, the staff of the Archives of the city of Edmonton and the staff of the City Clerk's Office for their excellent co-operation. Appreciation is also extended to the Hudson's Bay Company for permission to examine their old records on microfilm in the Public Archives in Ottawa.

In particular I would like to thank Mr. Willard Worthington of the Star-Key Mine for his time and patience in explaining the workings of an operating underground mine, and for a number of illuminating comments on mining in Edmonton in the past.

Special thanks are also due to my supervisor, Dr. R. G. Ironside for his constructive criticism of the manuscript, for being available for consultation during the summer, and

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And finally, my sincere thanks to my friends, for their offers of assistance at crucial moments and for taking time out from their own studies to encourage me in mine.

TABLE OF CONTENTS

CHAPTER

CHAPTER

LIST OF TABLES

## LIST OF FIGURES

| FIGURE | | Page |
|---|---|---|

# INTRODUCTION

A sense of history in western Canada is lacking because of the fragility and sparseness of the cultural landscape or its remnants. This feeling seems manifested by the concern of public and private agencies to establish in the present, physical examples of the past culture of Alberta such as the reconstruction of Fort Edmonton. This study intends to examine an important aspect of the development of Edmonton - the role of coal mining as it has influenced, and in turn been influenced by the growth of the city.

The geographer brings to his study of history a concern with place, location and causation, as well as an analytical methodology differing from that of the historian who is more concerned with people and events. As Williams (1970, p. 403) says,

> "... the reviewer would prefer the definition of historical geography as simply a way of thinking of spatial and locational questions in a time dimension, asking how things have come to be where they are, how and at what rate changes have occurred, the influences of environment, technology and society on these changes, what have been the antecedents of phenomena, and the light that the past throws onto the present."

This study will be approached in the spirit of the above quotation.

The city of Edmonton is an outgrowth of the fur

trade, and of the rivalry which existed between the Hudson's Bay Company and the North West Company. These two bitter but shrewd rivals found the site on the banks of the North Saskatchewan River to be the most advantageous one from which to carry on trade with both the Blackfoot tribes which occupied the plains to the south and west and the woodland Cree tribes which lived in the forests to the north. It was also an important trans-shipment point for goods being sent north to Lake Athabasca and for goods going farther west into the mountains via the Athabasca Pass and the Columbia River[1].

After the Hudson's Bay Company ceded Ruperts Land to Canada, the community around the Fort grew slowly. In 1892 a branch line of the Canadian Pacific Railway was built northward from Calgary, inaugurating a period of growth as settlers arrived to homestead the fertile, unoccupied land. Edmonton experienced cycles of 'boom' and 'bust' but northern development based on the city during and following World War II and the discovery of major oil fields in the vicinity brought to it the status of a major regional service centre. To-day Edmonton is the fifth ranking metropolitan centre in Canada (after Montreal, Toronto, Vancouver and Winnipeg). This tremendous growth has been

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[1] The northern route was necessary because the Blackfoot tribes controlled the southern plains and refused to allow the establishment of trading posts in their territory.

compressed into a short period of time and in the process most traces of the early beginnings have been erased.

Some of the events of Edmonton's growth have been recorded in popular form by MacGregor (1963), (1967) and Cashman (1956), (1958). Aspects which are of particularly geographical interest have been described by Jones (1962)[2]. Other studies such as that by Marlyn and Lash (1961) have been presented at symposia or have appeared in periodicals. Most of these works are broad in scope.

Aims:

The aim of this study is to describe the origins, development and decline of the Edmonton District coal field. In the following chapters the writer will attempt to explain how and why the particular mining areas around the city of Edmonton were developed, the problems encountered by the mine operators in developing their properties and marketing their produce, the importance of the industry to the growth of the city and the problems which the coal mines created for the expanding city.

The area occupied by and surrounding the city of Edmonton is underlain by extensive and easily accessible beds of brown or lignitic coal. The particular composition of the coal with respect to carbon content, ash, water and uncombustable material, made it suitable for domestic use

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[2] "The Historical Geography of the City of Edmonton" by Owen Jones is cited by R.C. Harris in The Canadian Geographer, vol. XI, no. 4, 1967. It is an unpublished M.A. thesis held in the University of Toronto library and is not available for interlibrary loan, so that the writer was not able to consult it in the preparation of this work.

and for raising steam in fixed installations, although it was not suitable for general use in railway locomotives.

The prairies are characterized by a harsh winter climate, and the presence of so large a fuel source so close at hand gave Edmonton an advantage over places such as Battleford and Prince Albert in attracting settlers. Before 1870 the small number of Hudson's Bay Company personnel at Fort Edmonton had found the business of securing enough firewood to see them through the winter a continuous chore (Post Journals, var. ref.). It seems clear from the comments of the Company men, travellers and the early newspaper editor (Edmonton Bulletin, var. ref.) that, had firewood been the only source of domestic heat, it would have been a limiting factor in the growth of the community. A smaller community might not have been able to attract railways, and without the railways Edmonton would have stagnated. A growing city provided an expanding market for coal, so the coal mining industry grew apace. The railways also made it possible for the mines to transport coal out of the district, causing further expansion of the industry. At its peak, the coal mining industry made a substantial contribution in terms of employment and earnings, to the economy of Edmonton.

At first most of the mining was done between November and April. The drifts were run horizontally into the flat lying seams from the river bank. Meltwater in the spring flooded them, making entry impossible or at least unsafe until mid-summer. Winter cold kept the roof of the

drift frozen, thus making cave-ins less likely and also making it possible for the operator to economize on pit props. In this case the drift collapsed in the spring and a new one would be started in a different location in the fall. Mines in the south side of the river usually waited until the river froze to move their coal in sleighs to customers on the north side. All of the early mining was done with pick and shovel so that winter jobs were provided for men who farmed during the summer. In later years the larger mines became mechanized and operated all year round, employing large work forces.

Removal of the coal caused subsidence of the land surface so that the industry also produced some changes in the physical geography of the area. Occasional disturbances of streets and subsurface constructions such as sewers, gas mains and water mains indicate that the affected areas are not yet completely stabilized. The extent of the disturbed areas and the effect, if any, on the development of the city will be examined.

The coal mining industry at Edmonton died during the late 1940's when natural gas and oil became the preferred methods of domestic heating. Many present day residents of the city do not know that there ever was such an industry. One aim of this study is to reconstruct the growth, development and decline of this industry and assess the over-all importance of this one economic activity to the growth of Edmonton.

Scope:

The geographical boundaries of this study coincide with those of the Edmonton District as presently[3] defined by the Mines Branch, Department of Mines and Minerals, of the Province of Alberta (see fig. 1). This includes a large area around the city of Edmonton, but it is the smallest statistical unit of the province for which data relative to coal mines are readily available. Some of the mines were outside the present city boundaries. Most of the coal produced in these mines was sent to the city for use or for shipment, so it seems reasonable to include them in the study. Since most of the coal mined within the district was sold there, and since most of the miners resided within the district, the Edmonton District may be regarded as an economic unit for purposes of this study.

The temporal scope of this study includes the period from 1802 to the present. The date 1802 marks the construction of Fort Augustus by the North West Company and Edmonton House by the Hudson's Bay Company on the north bank of the North Saskatchewan River below the site presently occupied by the Provincial Legislative Building. In the years that followed, some native coal was used in the blacksmith's shop, but neither company exploited this resource to any

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[3] The Districts originally listed in Mines Branch Annual Reports were Namao, Cardiff, Edmonton and Clover Bar. In 1923 Edmonton District was divided into Edmonton and Strathcona. In 1925 all five districts were combined to form the Edmonton District which is considered in this study.

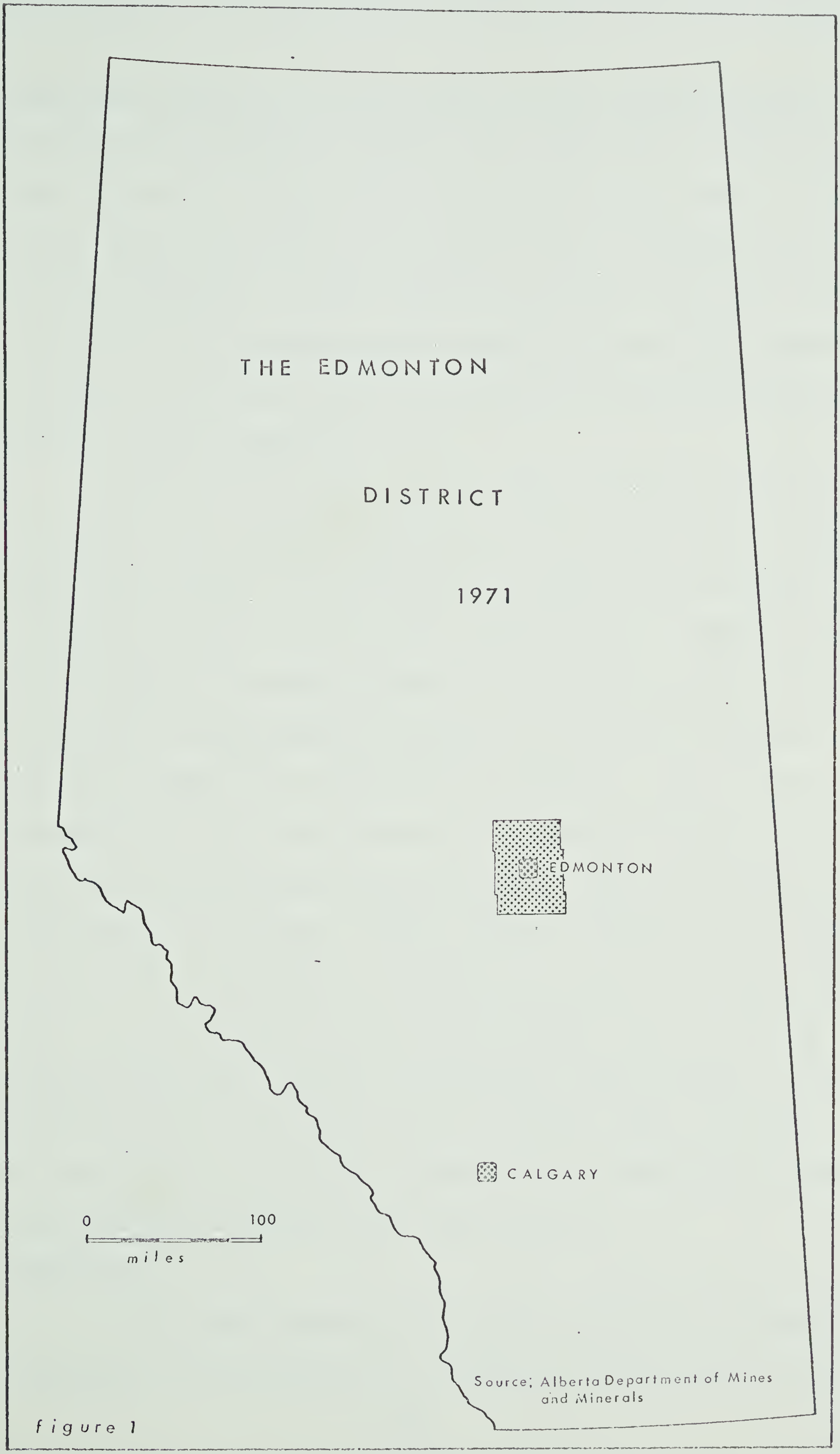
THE EDMONTON
DISTRICT
1971
EDMONTON
CALGARY
0
100
miles
Source; Alberta Department of Mines
and Minerals

figure 1

significant extent. In the middle 1800's Edmonton House was an important stopping point for all travellers in the north-west. A number of these men who published accounts of their journeys (eg. Paul Kane, Lord Milton and Dr. Cheadle, and the Rev. George M. Grant) commented on the coal seams clearly visible in the banks of the river, so that large numbers of people were made aware of the existence and accessibility of this valued resource.

The coal was first mined commercially by settlers during the late 1870's, some of it on contract for the Hudson's Bay Company. As Edmonton grew and the surrounding countryside became more densely settled, the industry expanded to supply a growing market. The quality of the coal is such that it disintegrates easily on exposure to weather and it is therefore difficult to stockpile. This led to shortages during severe winters. During mild winters work forces were reduced and the small mines shut down early in the spring. Production figures varied widely from one year to the next, depending on how long and cold the winter had been. When the industry was at its peak, before oil and natural gas became serious competitors, coal output for the Edmonton District was over half a million tons per year. At present two mines still operate in the district to serve the remaining, largely rural farm, market.

Techniques:

In a study approached from the historical geographic viewpoint, it is necessary to identify changes which occur

gradually over a substantial period of time. These gradual changes excite little comment at the time they occur, and are not well documented. Most of the research must be done in the library rather than in the field, as few traces of the industry have survived urban expansion. Valuable information concerning the discovery, analysis and use of the coal in the Hudson's Bay Company period is found in the journals and reports of travellers and scientists who visited the area during the nineteenth century. Particularly informative are comments by the Rev. George M. Grant of the Sanford Fleming expedition and Dr. James Hector of the Palliser expedition. The Post Journal kept by the chief factor at Edmonton House for the directors of the Company in London presents a very complete record of the day - to - day employment of the men. Occasional references are made to "the digging of coals from the river bank" (Post Journal, Nov. 9, 1863). The Edmonton Bulletin, first published in December, 1880, contains numerous references to the activities of the coal miners. The files of the Edmonton Journal also contain valuable information for the time following its establishment. After the passage of the Mines Act, detailed records of all mines in the area were kept by the District and later the Provincial Government. Trade periodicals such as the Western Canada Coal Review often refer to activities in the Edmonton coal field. A number of unpublished theses have been consulted either for specific information concerning the subject or for methodological guidance. These include

Beach (1934), Seale (1966), Lake (1967) and den Otter (1968). Most of the information for this study was drawn from the above sources.

Since the subject of this study is part of the recent past, there are people still living who were directly connected with the industry or had some knowledge of it. Conversations with some of these people have been most interesting and informative.

Some statistical data including number and approximate locations of mines in various years, and quantity of coal mined and destination on a yearly basis are available. It is proposed to condense and tabulate or map this data so that fluctuatuins in production and changing market patterns can be seen. Complex statistical analysis of this data does not seem to the writer to serve any useful purpose.

Any reconstruction of the past must be incomplete. Canadians do not have a good sense of their own past, being more concerned with the future. Consequently records have not been well kept, have not been kept at all or have since disappeared, so that substantial portions of history have been permanently lost. Where data are missing, as is evident in the coal mining record of the Edmonton District, any reconstruction must be less than completely accurate.

Methodology:

As mentioned earlier, historical geography has its own approach, outlook and methodology which have been defined by workers in the field. Hartshorn (1959, p. 84)

writes,

> "Geographers study the past not only as 'the key to the present' but also in terms of its own geographic content. Each past period has its then present geography, and the comparative study of the different geographies through successive periods of time depicts the changing geographies of an area. Thereby the historical dimension of time is combined with the dimension of space."

Much the same view is shared by East (1965) and Broeck (1965). Williams (1970, p. 403) says,

> "One can take the view that historical geography is either a study of the past for its own sake and must therefore exclude all current geographical work, or that historical geography is simply the historical treatment of geographical themes. The first definition is a restricted one perhaps more in keeping with the methodological approach of the professional geographer; the second definition is a wider one, more relevant to the contemporary scene and viewing past and present as but points in time in a never-ending process of change."

This study will be pursued from the point of view expressed by the second definition, it being the opinion of this writer that this approach will produce the most complete and useful picture of one aspect of the growth of Edmonton.

Two basic methodologies in historical geography have been outlined by Broeck (1965) and Darby (1962). One involves taking a series of cross sectional descriptions of the subject area at different times and joining them by thematic descriptive sections. The second involves a linear approach in which one aspect of the area with its changes and side effects is traced from some point in the

past to another point later in time. The linear approach was thought to be most suitable for this study but, as changing distribution patterns of the mines are to be mapped and the interaction between coal mining and the development of Edmonton will be considered, cross-sectional aspects will intrude.

Other works in Canadian historical geography have been studied for methodological guidance. These include A.H. Clark (1959) and D.W. Moodie (1965). Two theses dealing specifically with the coal mining industry of Alberta which were particularly useful were Seale (1966) and Lake (1967).

In a geographical study of some aspect of the past in which time plays such a dominant part, the danger exists that the study may become one in geographical history rather than historical geography. By emphasizing space relationships and geographical controls on the development of the coal mining industry in Edmonton, the writer hopes to keep the study within the boundaries of geography.

## CHAPTER I

## THE GEOLOGY OF THE EDMONTON COAL FIELD

The geology of the Edmonton area has been discussed in a number of papers and reports. Dr. James Hector of the Palliser Expedition was the first to make specifically geological observations around Edmonton (Palliser Papers - Hector, Jan. 9, 1858, p. 202). Most of his observations were of the strata exposed in the banks of the North Saskatchewan River. His comments on the geology including those on the coal seams, appeared in the Expedition's final report. Hector's observations were drawn upon extensively by Dr. A.R.C. Selwyn of the Geological Survey of Canada,[1] who made a very rapid tour through the area in the summer of 1873, gathering information to assist in planning the proposed trans-continental railway. Dr. Selwyn's report was published in the G.S.C. Annual Report for 1873 (Selwyn, 1873, pp. 17-62).

The first detailed geological studies in the area were carried out by J.B. Tyrell of the G.S.C. in 1886. Later studies concerned specifically with the coal-bearing formations were done by Dowling (1910), Beach (1934), Allan

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[1] Hereinafter referred to as the G.S.C.

(1943) and Pearson (1961). A study of the Edmonton formation using data from oil well logs has been completed by Ower (1960). Bayrock and Hughes (1962) have described the surficial deposits and mapped them on a scale of one inch to one mile. Logs from plans of mine workings held at the Mines Branch, Department of Mines and Minerals, provide information as to thickness and nature of overburden, thickness of coal seams, the number, nature and thickness of partings and separation of the coal seams, which supplement the already published material.

For the purposes of this study a summary of the geological information is presented as an aid in understanding some of the physical problems encountered in developing the coal mining industry.

Age and Origin of the Formation:

The Edmonton formation (see fig. 2) is now considered to be Upper Cretaceous in age, although some of the early investigators thought the upper member might belong to the Tertiary. The overlying Paskapoo formation which occurs north and west of the Edmonton District is attributed to the Tertiary, so that the contact between the two formations marks an important point on the geologic time scale. Considerable effort has been made to determine the ages of formations which occurred near the transition between the Mesozoic and Cenozoic eras. Harbaugh (1968, p. 108) gives a potassium-argon date for coal from the Uppermost Cretaceous in Alberta of sixty-three million years,

+/- two million years. This formation is only from one quarter to one fifth as old as the Carboniferous formations with which the anthracite and high-grade bituminous coal deposits of eastern North America are associated. "It is important to note that the 'maturing' of coal in Alberta appears to be due much more to the pressure from the upthrust of the Rockies than to mere lapse of time." (Alberta Coal Commission,[2] 1925, p. 1). This explains why younger beds close to the mountains are of a better grade of coal than older beds further to the east.

Allan and Sanderson (1945) divided the Edmonton formation into three members based on lithology; Ower (1960) divided it into five members (see fig. 2). The coal deposits of the Edmonton District are associated with Allan and Sanderson's Lower Edmonton member and Ower's member A, which are nearly coincident. Over most of its area, the Lower Edmonton member overlies the Bearpaw marine shales but towards the north the Bearpaw formation appears to pinch out, while the Lower Edmonton member becomes thicker and rests directly atop the Belly River formation. Apparently the Edmonton District is on the shoreline of the Bearpaw Sea where deposition of the marine shales did not take place. Drill holes north of the North Saskatchewan River do not show any trace of the Bearpaw formation. The shales and

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[2] Hereinafter referred to as the A.C.C.

THE EDMONTON FORMATION (figure 2)

Paskapoo

| Lithology of the Northern Portion of The Edmonton Formation (after Ower, 1960) | Ower's Member | Allan and Sanderson | Some Associated Coal Seams |
|---|---|---|---|
| dull green to grey slightly bentonitic shales; fine to coarse salt and pepper sandstones; heavy coal seams. | E 185 - 400 feet | Upper Edmonton | Big Seam (Goose Encampment |
| Kneehills tuff zone; black to brown bentonitic shale containing purplish tuffaceous shale and bentonitic clayey white sand at base. | D 20 - 50 feet | Middle Edmonton | |
| Bentonitic grey shales and salt and pepper sandstones containing several coal seam horizons; on North Saskatchewan River a heavy sandstone on top. | C 200 - 300 feet | | |
| Light green somewhat bentonitic shales with lenses and beds of salt and pepper sandstone. | B 200 - 300 feet | | |
| Grey and brown bentonitic shales containing considerable carbonaceous matter; white and light grey salt and pepper feldspathic sandstones; ironstone bands and concretions common, numerous coal seams and beds of coaly and carbonaceous shale; thickens rapidly to north replacing underlying Bearpaw shale. | A 420 - 900 feet | Lower Edmonton | Big Island Seam<br>Clover Bar Coal Horizon |

Bearpaw

sandstones of the Edmonton formation are considered to be fresh water deposits or, in the Lower member, possibly brackish water deposits.

The surficial materials in the Edmonton District are mainly clays, sands and gravels. Sections taken in the downtown area of the city show bedrock overlain by from ten to fifty feet of Saskatchewan sands and gravels (Bayrock and Berg, 1966). These in turn are overlaid by glacial tills, from fifty to one hundred feet in thickness. Above the till, lake sediments form a layer averaging ten feet in thickness. In the study area the overburden is usually less than one hundred feet thick.

The Coal Seams and Intervening Deposits:

Around Edmonton the Middle and Upper members of the Edmonton formation are not present. The coal horizons and intervening strata all belong to the Lower member which is about five hundred feet thick at this point. The strata dip at about twenty feet per mile to the south-west, but for the purposes of any individual mine they are considered horizontal.

According to Ower (1966) the Lower member (his member A) is made up of light grey and brown bentonitic shales, white and light grey salt-and-pepper feldspathic sandstones interspersed with discontinuous coal seams, carbonaceous shales, ironstone bands and concretions. Descriptions from the Mines Branch records indicate that the material immediately above and below the coal seam is often bentonitic clay.

Beach notes that there are very few sandstone members present. Structurally this is a very weak formation.

Beach (1934) identified ten separate coal seams in the Edmonton coal field (see fig. 3), which he numbered from one to ten, beginning at the bottom. Some of the seams are discontinuous; they pinch out in one location but are present at nearly the same elevation in another location. This is probably due to the fact that the growth and deposition of the organic material took place in a number of small swamps rather than one large one. The Upper Cretaceous landscape must have been one of relatively low relief and poor drainage. Water accumulated in broad shallow depressions which slowly became filled with aquatic and semi-aquatic vegetation to form peat beds which were later transformed into coal seams by compression. Beach (1934, p. 58) suggests that clay partings in the coal seams might represent a shrinkage of the swamps and an advance of the shoreline but they also might represent inundation of the seams and deposition of sediment. Seams may also be interrupted by washouts, where a stream has downcut through the coal seam and removed the coal over a considerable area. The outcrops on the banks of the North Saskatchewan River mark the points where the river has downcut through the seams in the process of eroding the riverbed. In the process, large volumes of coal and other material have been removed. Where this occurred in pre-Wisconsin glacial times, the space left by the removal of the coal has been filled by glacial material and

unless a careful drilling program is carried out beforehand, a prospective coal mine operator may lease rights to an area where most of the coal has been removed by erosion, since no indication of the pre-glacial stream remains on the surface.

Because of the discontinuous nature of the coal deposits, Dowling, Beach and Pearson all refer to coal horizons rather than to coal seams when discussing a particular deposit over an extended area.

The two lowest seams (Beach's number one and two, see fig. 3) were apparently never worked due to their depth below the surface. The number one seam is about eight feet thick in the one borehole where it was measured and is at an elevation of 1750 feet m.s.l., or about 450 feet below the surface. The number two seam was also measured as eight feet thick at an elevation of about 1820 feet m.s.l., or 380 feet below the surface. More holes would have to be drilled to determine the thickness and extent of these seams accurately.

The number three seam, or Lower seam is from ten inches to five feet in thickness and persists over a wide area. It occurs from twenty-seven to thirty-four feet below the Clover Bar seam and has been worked in a number of the mines. The Clover Bar and Lower seams are so close together that caving in the worked out areas of the upper seam endangered working areas in the lower seam, so they were not mined together in the same mine. Some gas has been reported in mines working the Lower seam, which is unusual in the Edmon-

ton District.

The number four or Clover Bar seam has the greatest known extent of any seam in the area. It was mined primarily east of the city in the districts known as Beverly and Clover Bar, and north of the city near Carbondale, Cardiff and Morinville. It outcrops on the riverbank near the Clover Bar bridge where it is covered by about 120 feet of overburden. This overburden thickens toward the west as the land rises and thins toward the north because the seam is dipping toward the south-west. Pearson is quite specific in defining this as a coal horizon rather than a seam because its variable thickness and discontinuous nature indicate that, while all the coal was formed at the same time, it was not formed in one large swamp but in a number of separate basins (Pearson, 1961, p. 9). Most of the mines which had a substantial tonnage production and an operating period exceeding ten years were working in this horizon. Beach regards the new Humberstone mine (Mine no. 43), which was working a seven foot seam, as being near the center of a basin. The seam thinned away from this mine. Around Morinville, a seam at the same elevation is twelve feet thick, possibly representing the center of another basin.

The number five seam is a continuous seam, seldom over three feet thick, which occurs about thirty-five feet above the Clover Bar seam. Beach says that no mines were developed in this seam but since it outcrops at water level west of the Low Level bridge, some coal may have been dug

COAL SEAMS OF THE EDMONTON FORMATION (diagramatic)

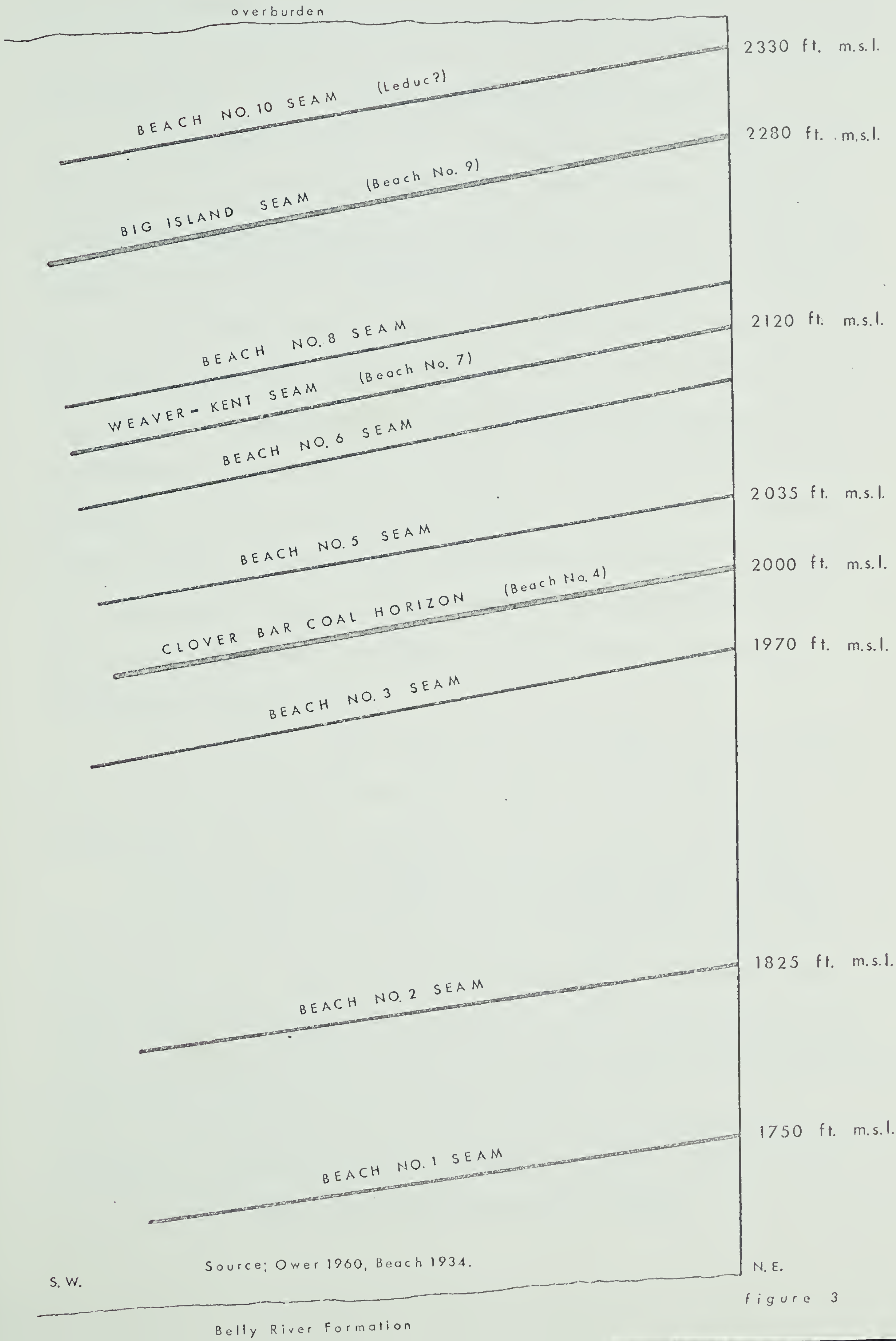


figure 3

from the outcrops by individuals for their own use.

The number six seam is less than two feet thick and discontinuous. It is of no commercial importance.

The number seven seam, or Weaver seam, occurs at an elevation of about 2000 feet m.s.l. west of the city. It is about 120 feet above the Clover Bar seam and is from six inches to six feet in thickness. This seam is not present east of the city but was worked by mines in the center of the city and by the Kent and other mines west and south of the city. It outcrops on both sides of the river as far upstream as the High Level bridge. The first Humberstone mine was a drift in this seam east of the site of the Macdonald Hotel. To the east the coal in the seam is fragmented into small lumps. Beach speculates that this may be due to crushing by the weight of the advancing glaciers during the Pleistocene.

The number eight seam has been found in bore holes from Laurier Park and Whitemud Creek. It is from three to three and a half feet thick and has not been exploited.

The number nine seam or Big Island seam, extends over a considerable area west and south of the city. It occurs 280 feet above the Clover Bar seam. The seam outcrops with a thickness of six feet at the Big Island, nine miles upstream from Edmonton. In 1882 efforts were made to work it as a strip mine to provide coal for the river steamers. The seam becomes thinner eastward and outcrops as a two foot seam near the High Level bridge.

The number ten seam occurs fifty feet above the Big Island seam. It is a seam of fairly good coal three and one half feet thick but it was not mined, except possibly by individuals for their own use. The description and the elevation make it seem likely that this is the seam which Ower designates as the Leduc seam.

Quality and Quantity of the Coal:

According to Stansfield and Lang (1944, p. 11), coal from the Edmonton field is classed as sub-bituminous B and C. According to the definition they give, sub-bituminous B grade coal will yield between 9,500 and 11,000 B.t.u.[3] per pound burned. Sub-bituminous C will yield between 8,300 and 9,500 B.t.u. per pound burned. It is further described (Stansfield and Lang, p. 20) as "a free-burning, non-coking coal that ignites easily and burns with a long, smokeless flame." A typical analysis of coal from the Clover Bar seam is as follows;

| Proximate[4] | | Ultimate | |
|---|---|---|---|
| Moisture | 25.0% | Carbon | 51.6% |
| Ash | 6.2% | Hydrogen | 6.2% |
| Volatile Matter | 28.4% | Sulphur | 0.3% |
| Fixed Carbon | 40.4% | Nitrogen | 1.0% |
| | | Oxygen | 34.7% |
| | | Ash | 6.2% |

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[3] B.t.u.; British thermal unit, quantity of heat required to ra..se the temperature of one pound of water through one degree Fahrenheit, 251.98 calories.

[4] Terminology is that used by the Alberta Research Council in its analyses.

Cleanness and convenience made this coal highly satisfactory for domestic heating. It was easy to transport so that it was able to capture and hold a market beyond the Edmonton area, extending into Saskatchewan and Manitoba where, during the 1920's Alberta coals partially displaced American anthracite. All forms of domestic coal lost their markets in competition with natural gas which was both cleaner and more convenient, although not necessarily cheaper.

One important difference between Alberta coals and eastern coals which was not significant in the past but is very important now that urban air pollution from thermal electric generating stations has become a problem, is the low sulphur content of the coal. The coal around Edmonton would be suitable for use if the city should ever have to revert from natural gas to coal in the power plant. The city has not had any problem with acid wastes from the old workings under the city as has occurred in the high sulphur coal fields of the eastern United States.

The only serious problem with the Edmonton coal was that it had to be stored under cover. Extended periods of exposure to air caused oxidation of the coal. It was also subject to slacking, or breaking up as it lost its moisture content, thus causing a degrading of the coal according to the grading standards established by the Alberta Research Council (see Table I). Degraded coal sold at a lower price, thereby lowering the sellers' profits. For example, a dealer

TABLE I

COAL SIZES AND GRADES

| Size Designation | Size Limits (round hole screens) | Trade Designation |
|---|---|---|
| A | retained on 1/8 inch screen | run of mine or dock run |
| B | retained on $1\frac{1}{2}$ inch screen | lump |
| C | passing 3 inch screen, retained on $2\frac{1}{2}$ inch screen | egg |
| D | passing $2\frac{1}{2}$ inch screen, retained on $1\frac{1}{2}$ in. screen | stove |
| E | passing 2 inch screen, retained on 1/16 inch screen | nut slack |
| F | passing 3/4 inch screen, retained on 1/32 inch screen | slack |
| G | passing $1\frac{1}{2}$ in. screen, retained on 3/4 in. screen | stoker nut |
| H | passing 3/4 in. screen, retained on 3/8 in. screen | stoker pea |
| J | passing 9/16 inch screen, retained on 5/16 inch screen | buckwheat no. 1 (blower) |
| K | passing 5/16 inch screen, retained on 3/16 inch screen | buckwheat no. 2 (blower) |
| L | passing 3/16 inch screen, retained on 3/32 inch screen | buckwheat no. 3 (blower) |

Source: Allan, Coal Areas of Alberta; 1943, p. 54.

might buy a shipment of 'egg coal' from a mine in the spring and have to rescreen it and sell part of it as lower priced 'nut coal' and 'slack' in the fall. Rather than invest capital in storage facilities, mine operators found it more convenient to cut back production during the summer months or close their mines entirely, thus producing a dislocation in the labour force. Dealers waited until fall to submit orders to the mines. Unfortunately at that time of year, coal shipments conflicted with grain shipments, limiting the expansion of the market in other provinces. Quite extensive efforts were made to overcome this problem by persuading consumers to order their coal early and store it in their basements where it would be protected. This met with very limited success (Edmonton Journal, May 1942, var. ref.; Edmonton Journal, Sept. 1942, var. ref.).

Edmonton coal was also suitable for steam raising in fixed installations such as the thermal electric generating station. It was never extensively used by the railways, the reason being that it burned too quickly and more of it was required to raise an amount of steam equivalent to that produced by a ton of coal from the mountain fields. This made Edmonton coal the more expensive of the two. Using Edmonton coal would also have required that the locomotives have larger tenders, or that they be 'coaled' more often.

A ton of Edmonton coal produced about 50% more heat (Stansfield and Lang, p. 51) than a cord of wood. As soon as the building of the railways made it possible to move coal

out of the district, a market was opened up in the coal-less areas to the east in Saskatchewan and Manitoba, even in the forested parts of these provinces, as well as in northern Alberta. In central Alberta, stiff competition with the Lethbridge and Drumheller fields, which produced an equivalent grade of coal, was the rule.

Estimates of the amount of mineable coal in the Edmonton field are extremely variable, partly because different areas have been considered and partly because there are different opinions as to what constitutes 'mineable' coal. Dowling (p. 43) made the following statement;

> "In making an estimate therefore of nine feet of available coal over a distance of seven or eight miles along the stream North Saskatchewan River and a mile on either side, a total of 80,000,000 tons of mineable coal seems within the bounds of possibility for the immediate vicinity of Edmonton."

Dick (1914, p. 101) estimated the total area of workable coal in the Edmonton formation at 12,800 square miles with a probable coal content of 71,000,000,000 tons. The Alberta Coal Commission of 1925 defined as mineable coal seams two feet or over in thickness and within 1,000 feet of the surface (A.C.C., 1925, p. 34). On this basis, the Edmonton District with an area of 115 square miles contained coal reserves of 1,382,400,000 tons.

Mining Technology:

Coal mining in the Edmonton field was not efficient by current technological standards. Most of the mines were underground workings using the room and pillar method of

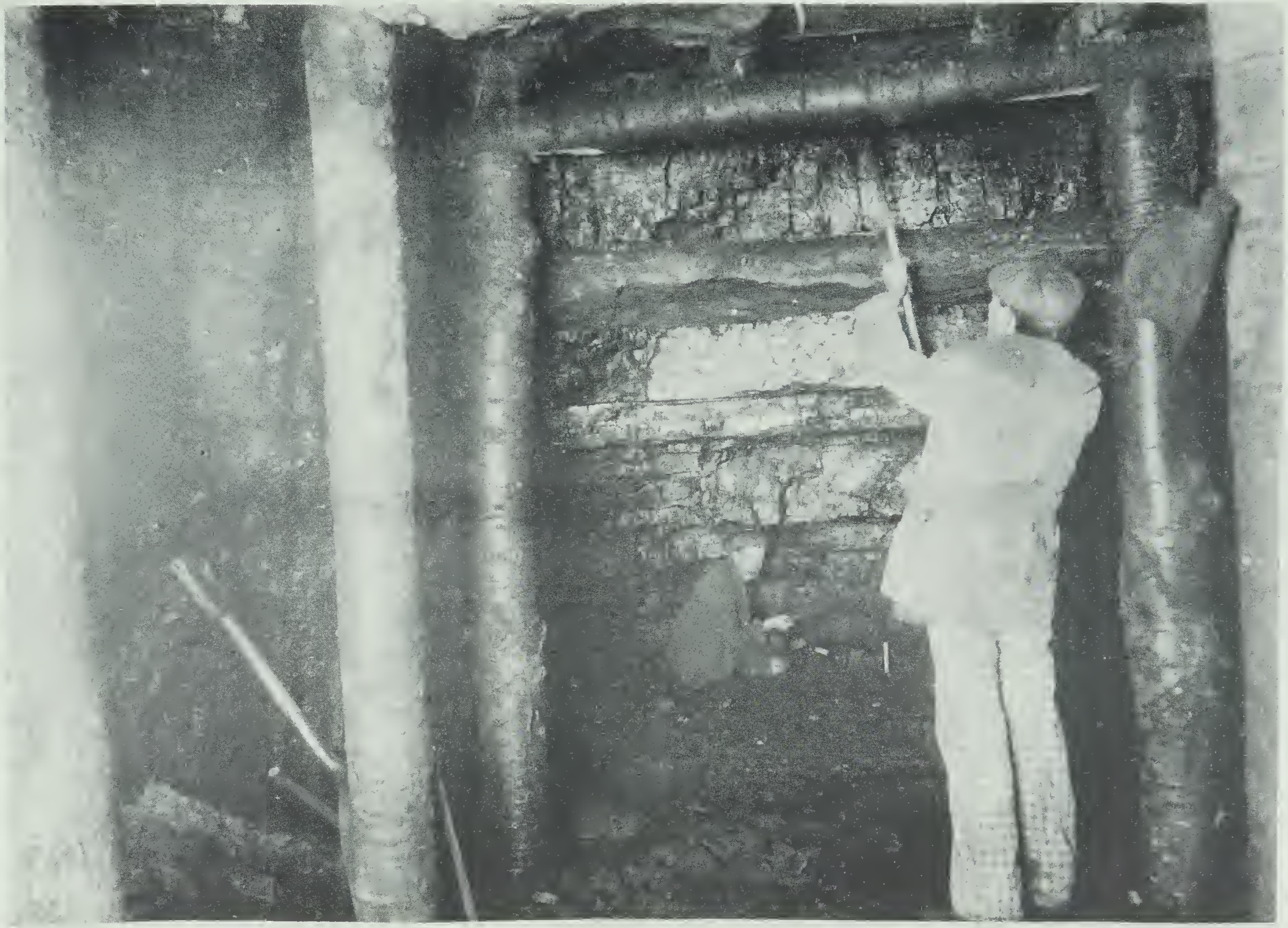

Figure 4: Interior of the Clover Bar Coal Company Mine. Note the timbering and the thick clay (bone) parting in the coal seam about four feet above the seated miner.

extraction which did not lend itself easily to mechanization. A few of the thicker seams were partially worked out but mines were often abandoned because thinning seams, rising labour costs and long hauls to the tipple[5] raised operating costs over revenues. In 1937 the Kent Mine and the Banner Mine adopted the more efficient longwall system of mining using face conveyors (Mines Branch Annual Report, 1937, p. 7). This system was also used successfully by the new Penn Mine at Carbondale (Mr. W. Worthington, pers. com. August 3, 1971). In 1946 Mine No. 1366 operated by the Beverly Coal Co. Ltd. tried the longwall system. The initial face was 400 feet long but this was quickly shortened to 300 feet (Mines Branch Annual Report, 1946, p. 8). Within a year the longwall method was abandoned and the room and pillar system resumed. The success or failure of the longwall system depended on the strength of the roof. With no pillars to support it, a weak roof tended to cave in right up to the working face unless very extensive timbering was done. The gain in more complete extraction of the coal was outweighed by the extra timbering needed to keep the working space open.

Large quantities of coal are still present but estimates of remaining reserves do not exist. For example, the extent of the number one and number two seams has never been determined. Since there is at present no market for the coal, no one has gone to the trouble of mapping the thickness

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[5] For an explanation of room and pillar mining, see Chapter VI.

and extent of all ten seams accurately. Until this is done, it would be useless to speculate about the long term feasibility of mining by strip mining or underground methods.

Any resumption of mining in the immediate Edmonton area seems unlikely because of the urbanization of the landscape overlying the coal seams. Pearson (1961, pp. 12,13) estimates that some reserves north of the city are technically strippable, although this is not at present the case economically, but strip mines are unacceptable at a time when increasing concern with the preservation of attractive landscapes around urban areas is being demonstrated. The re-establishment of extensive underground workings near the city is unlikely because of the subsidence problems involved and the small chance of an increase in the demand for this type of coal.

Effects of Geology on the Mining Industry:

The relative thinness of the overburden was a considerable advantage to the mining industry. Most of the mine shafts were less than 200 feet deep. The costs of sinking shafts and of bringing the coal to the surface are usually proportional to the depth of the shaft and the difficulty encountered in sinking it, so that thin overburden, easily dug through, was a favourable cost factor. No examples were found of the cost of sinking a shaft in the Edmonton field and cost data in mining engineering references were not directly applicable to the local mines because of differences in conditions and technology.

The soft overburden was not always an advantage; at least two collieries, one at Rabbit Hill and one near St. Albert had to abandon new shafts before they ever went into production because they could not keep them open. The old Ottewell Mine (Mine no.99) "sank a new double compartment shaft ... lined with concrete through the water bearing ground." (Western Canada Coal Review, Sept. 1926, p. 39). Most of the mines could be entered by walking down a slope,[6] thus saving the expense of constructing and maintaining a man-rated hoist.[7] The outcrops of the upper seams along the river banks made it possible to start many of the mines as drifts extending straight back into the coal seam, thus keeping development costs to a minimum. The mines which started this way and continued to operate for a number of years found it necessary to sink a shaft, first for ventilation but later to bring their coal to the surface near haulage routes. The focus of operations, the mine office, was shifted from the drift to the headframe over the shaft. The drift was allowed to fall into disuse or was kept as an airway and emergency exit.

Sinking a shaft through the unconsolidated overburden

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[6] Instead of a vertical shaft some mines were entered by a tunnel or slope from the surface down to the workings. At first, loaded cars were also hauled up the slope. After vertical hoisting shafts were installed for the cars, the slope was maintained as a way for the workmen to enter and leave the mine.

[7] A hoist which met the safety requirements for and was of a design suitable for use as an elevator by the miners as well as for hoisting mine cars.

and the weak clays and shales of the Edmonton formation did not require special equipment or particular engineering skill, although the walls required careful timbering to keep them from collapsing. The weak bentonitic clays and shale did not make strong roofs and here again extensive timbering was always necessary. Even so, roof falls in the main tunnels were common in the early days, and room usually collapsed or 'caved' shortly after being worked out. Where a coal seam had a bone[8] parting near the top, it was common to mine only the coal under the parting and leave the layer of coal above it as a roof.

Water was always a considerable problem in the mines. When drifts were being opened from the riverbanks, it has been sometimes assumed that the spring flooding commonly mentioned, was due to the river rising and flooding into the drift mouths. This did happen in some mines during high spring or fall floods (Edmonton Bulletin, April 6, 1900). A more common cause of flooding seems to be the percolation of meltwater down through the strata. The clays and shales, although they have a high capacity to absorb water, are not good aquifers. The excess water accumulated in the open spaces of the mine or in the worked-out and partially collapsed areas. Since the strata are nearly horizontal, flow to the outside via a drift exit was slug-

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[8] A bone parting is a layer of clay or shale no more than a few inches thick within the coal seam.

gish. Mines working in areas adjacent to the worked-out areas of other mines, found water particularly troublesome since every time they tapped the old workings they experienced a degree of flooding.

Reference to gas accumulation in the Edmonton mines is infrequent. When the problem did occur, it was usually because the mine in question had tapped the old workings of an adjacent mine. Gas or black damp, accumulated in the old workings and was released into working areas of the mine which adjoined them.

The coal seams themselves seem to have been quite easy to work. The major difficulty occurred where a seam began to pinch out and became too thin to work, at which point that section of the mine would be abandoned.

For mining purposes, the strata were described as horizontal, although they did dip at about twenty feet per mile to the south-west. Local irregularities were caused by 'rolls' in the seams. These are thought to have been caused by the pressure exerted by the glacier advancing over the area during the Wisconsin glacial period. The pressure of the advancing ice forced the strata into waves ahead of it. Compression caused a thickening of the seam at the roll. If this explanation of rolls is the correct one, rolls should be more common where a seam was thinly protected but no data are available to prove this hypothesis. Rolls are present in the seams worked by the Star-Key Mine and the Egg Lake Coal Company Mine. At the Star-Key, they do not present any pro-

blem in mining the coal. At Egg Lake, rolls can be responsible for the coal being more deeply buried than anticipated, thus complicating mining operations somewhat.

Before the development of mobile drills for well-drilling purposes, the only way of determining the nature of the subsurface strata was to find an outcrop or dig a hole. Outcrops on the riverbank provided the geological information on which the coal mining industry of Edmonton was first developed. Occasionally a drift or shaft was reported as having been dug to confirm or disprove a suspected thick coal seam. The mines in the city of Edmonton, at Clover Bar and at Beverly seem to have been developed from such superficial information. All of these areas were in production before Dowling, the first person with extensive geological knowlege known to have examined the coal field in detail, made his report. North of the city the coal is so close to the surface that some farmers may have encountered the seam while digging wells. Once it became customary to drill wells for water, information from deeper levels became available. If well drillers had been required to keep careful logs of all wells drilled and if the information had been compiled, it would have been possible to make more definite statements about the extent of the Edmonton coal field thirty years ago than is possible to-day. Information obtained while drilling for oil and gas came when interest in coal had wained, so that it has not been processed to yield information regarding the coal field.

CHAPTER II

# THE EDMONTON COAL FIELD PRIOR TO 1892[1]

Indians and Early Explorers:

The coal deposits of the North Saskatchewan district were in existence long before the arrival of man on the North American Continent. They became identifiable when exposed coal seams caught fire due to spontaneous combustion or were ignited by grass or forest fires. The Indians were well aware of these burning 'rocks'. David Thompson (in Warkentin, 1964, p. 100) mentioned that the burning coal seam on the Smoke (Smoky) River in the Peace River district was the reason for the naming of the river, and added that the seam had been burning as long as any Indian living in the district could remember. Apparently the Indians never acted on their observation by using the coal in their own fires. Their surprise when Europeans did so has been recorded (Umfreville in Warkentin, 1964, p. 73).

Europeans were well aware of the uses and value of the coal. It is mentioned in a number of the reports and accounts of the North-West given by explorers and fur traders.

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[1] The year 1892 marked a major change in the situation of Edmonton. The Calgary and Edmonton Railway was completed to the south bank of the river in July of 1891 and from that time onward, Edmonton was no longer isolated.

They were impressed by its abundance and easy accessibility in the outcrops along the banks of the deeply incised rivers.

The Fur Traders:

The first Europeans in the North Saskatchewan country who left accounts of their experiences were employees of the North West Company and the Hudson's Bay Company. These people were primarily interested in the fur trade and their reports dealt mainly with the Indians, the wildlife, the climate and anything which influenced the balance sheet of the fur trade. Mineral resources had no value in the fur trade so they are mentioned briefly if at all. It has been speculated that information about such attractive aspects of the country, which might have encouraged settlers to come into the area, was deliberately witheld by the fur traders to protect their industry.

The first person to record the presence of coal on the North Saskatchewan was Edward Umfreville, an employee of the North West Company who, in 1786, was stationed at the western-most post on the Saskatchewan River. This was probably Fort Vermillion, west of present-day Battleford. He noted that the coal was brought downstream by the current and expressed the opinion that there must be vast quantities of it upstream, judging by the amount left on the shoals and sand-bars. An unnamed European acquaintance of Umfreville, who had travelled farther upstream, had brought back a piece of coal dug from an outcrop which Umfreville described as being in all respects similar to that brought to London from

the north of England and Scotland (Umfreville in Warkentin, 1964, p. 74).

David Thompson, also of the North West Company, was likewise familiar with the water-borne coal of the Saskatchewan, but he had a very good idea about its source. In 1800 he made a journey from Rocky Mountain House down the North Saskatchewan River and reported seeing a number of coal seams in the river banks. During the time he was at Rocky Mountain House, the blacksmith experimented with coal from a seam exposed in the river bank one hundred yards below the post. Said Thompson,

> "My Blacksmith tried this coal, and at the first trial it melted the rod of iron, and from the great heat it gave, he had to use half charcoal; and thought the quality of the coal superior to any brought from England." (Thompson in Warkentin, 1964, p. 100).

Alexander Henry the Younger, another officer of the North West Company, who was at Rocky Mountain House in 1810, also observed this coal seam and noted how the current was washing away the earth underneath so that the coal kept breaking off and falling into the river (Coues, 1965, p. 702). He commented on the use of the coal by the blacksmith, noting that it was used in combination with charcoal made from birch or aspen. On his way down the river in 1811, Henry noted the thick seam at Goose Encampment and seams near the Upper Terre Blanche. In these seams he noted the bone partings which commonly occur in the coal seams of the Edmonton formation. Henry visited Fort Augustus (the site of the city of Edmonton)

in the late autumn of 1809 when it was still occupied, but did not say whether or not the coal was being used. He camped in the abandoned post in 1811 but did not mention coal outcrops in the river bank near this point, although he had observed them seventy miles upstream. It is apparent that coal was found, used, or experimented with, elsewhere in the North-West, but from the evidence in historical accounts of the fur trade settlement, it is impossible to decide whether or not the fur traders who had occupied Fort Augustus Edmonton House up to this time were aware of the coal seams so near at hand.

The Establishment of Edmonton:

The first outpost in the Edmonton area was built by Angus Shaw of the North West Company in the summer of 1795 at the mouth of the Sturgeon River, the present site of Fort Saskatchewan. Competition between the 'North Westers' and the Hudson's Bay Company was so strong that where the one went, the other would immediately follow. In the autumn of 1795 William Tomison began the construction of Edmonton House a short distance away. It is worth noting here that Peter Fidler, who had examined the site in the summer of 1793 thought it was unsuitable because of the lack of timber (MacGregor, 1966, p. 89). It is unclear whether he was thinking in terms of timber for fuel or for other purposes, but a general scarcity of timber would make the business of obtaining enough firewood for the winter much more difficult.

In 1802 both posts were closed and the personel and

trade goods moved upstream to a site on the floodplain now occupied by the Rossdale generating station. In 1810 both posts were again closed and everything moved south to the mouth of the White Earth River at Smoky Lake, near present-day Pakan. In 1812 both posts were moved back to a site on the floodplain just below the present Legislative Building. The final move took place in 1825 after a serious flood, when everything was moved up on to the river terrace below the Legislative Building.

The joint moves were due in part to trade rivalry but an equally important factor was mutual protection. This was an area of tension between a number of Indian tribes, branches of the Cree and the Blackfoot nations. While the traders wished to remain apart from inter-tribal quarrels, it was not always possible to do so, and there were occasions when they found it advantageous to pool their manpower.

The Hudson's Bay Company Period:

The first definite reference to the use of coal near Edmonton occurs in the Edmonton House Journal for October 1, 1798 (Johnson, 1967, p. 145). "At 6 P.M. Gilbert Laughton and his party returned, brought ... a boat load of coal for the smith's use." This was coal which they had picked up from the sand bars, not coal dug from a seam.

In 1824 Chief Factor John Rowand, in his report to the Hudson's Bay Company Committee in London, mentioned the coal strata in the neighbourhood to Edmonton and noted that the blacksmith found the coal suitable for use in the forge

(Public Archives, microfilm, H.B.C. Collection, reel IM777). Rowand's comments are identical with those in a report by Colin Robertson, the previous factor, in 1823 (Ibid.). Rowand copied large sections verbatim from Robertson's report, so there is no way of knowing how important Rowand himself felt the coal seams to be. No effort was made to utilize the coal for cooking or heating. The Post Journals include numerous references to men being sent to cut large quantities of firewood. Paul Kane mentioned that eight hundred cords of wood were consumed each winter by a population which he estimated at about 130 (Kane, 1968, p. 93). Other sources have estimated the population as being closer to 100. One wonders why so much time and effort were expended in cutting firewood when enough coal to serve the same purpose could have been dug closer to the fort in less time. The reason for the use of wood seems to be that there were no stoves capable of burning coal in the settlement until 1874 when the first one was brought to Edmonton by John Walter. The cost of bringing supplies from the east was high, and priority was always given to trade goods.

Coal was used in the blacksmith's forge from an early date, and the Edmonton blacksmith provided an essential service in the North Saskatchewan district. In the 1820's there was only one blacksmith, but by the 1860's there was enough work to keep two fully employed. All of the York boats which carried the district's furs to and the year's trade goods from, Hudson Bay were built at Edmonton. New

boats were built each year and the blacksmiths made all of the iron work for them. They also made some of the small metal trade goods such as hatchets, knives and files and repaired trade goods such as muskets which were broken or defective. All of the metal work used around the fort, such as hinges, nails, the metal work on sleighs, wagons and harnesses and in the 1870's even stove pipes, (Newton, p. 37) were made in the forge. The Edmonton blacksmith also did the necessary metal work for Fort Pitt and Fort Carleton. It is not possible to determine to what extent the presence of coal suitable for use in the forge enhanced the importance of Edmonton as a metal-working centre at this time but it must have been a contributing factor.

Official notice of the coal seams at Edmonton was taken by the Hudson's Bay Company in the person of its Governor, Sir George Simpson during his trip around the world in 1841. In his diary he described the coal as anthracite and the seams as being ten feet thick (Public Archives, microfilm, H.B.C. Collection, reel 3M2). This description is not accurate, either as to quality of quantity; the Governor was somewhat over-enthusiastic.

The Post Journals of Edmonton House indicate a regular annual pattern of activity. Winter and early spring were devoted to trading with the Indians for furs and supplies. Spare time was often occupied in cutting firewood and working on the York boats. In the spring the winter's furs were packed in bales and the garden dug and planted. During the

summer most of the men went downriver with the brigade and activity around the fort was minimal. When the brigade returned with the supplies in late summer, the post had to be made ready for winter. This included harvesting the garden, cutting hay, cutting firewood, making charcoal and digging coal. The Post Journal for Sept. 8, 1863 records that "Beauchaine and ... Foley working at the charcoal kiln." The local coal could not be used by itself but had to be combined with a proportion of charcoal. In November, 1863 the Post Journal states that on at least six days, four men were employed "digging coals" and later, that two men were employed in carting up coals to the forge from the river bank. It is difficult to estimate just how much coal was dug, but, on the basis of known output from the primitive mines twenty years later, twelve tons (one half ton per man per day) does not seem too high a figure. The Post Journal shows that men were sent to dig coal for the forge in the autumn of 1864 and 1865 as well.

The absolute rule of the Hudson's Bay Company over the North West ended in 1869 but the company was well compensated in land grants for the rights which it ceded to the Canadian government. The Company used its unmatched knowledge of the country to choose holdings which would bring the best returns in the future. A letter from Donald H. Smith, Chief Commissioner, H.B.C., to Richard Hardisty, Chief Factor at Edmonton reads as follows,

"I trust you have secured for the Company some of

> the best coal deposits at and near Edmonton or other parts where it exists. This I consider to be of importance and if not already done you ought to do so without delay." (MacDonald, 1959, p. 156)

A comment in the Edmonton Bulletin of January 21, 1882 indicates that Mr. Hardisty not only claimed some of the coal lands for the Company but also claimed some for himself. Other early settlers, such as John A. McDougall[2] with a head for business and an eye to the future, also became involved in coal mining financially if not actively.

<u>The Palliser Expedition</u>:

The first geologically knowledgeable person to examine the Edmonton coal seams was Dr. James Hector, the chief scientific observer of the Palliser Expedition. Hector spent the winter of 1857-58 at Fort Edmonton and, in his own journal, made the following comment;

> "Included in these beds in the banks of the river at Edmonton are various seams of coal or lignite, which seems to be of a very useful quality, as it is used to the exclusion of all other fuel in the forge at the fort. The smith, who is also collier, tells me that its quality differs much, according to the distance from the outcrop, especially if it be acted on by the flood water, which has a very deliterious effect on the beds." (Spry, 1968, p. 202).

In the official Papers submitted to the British Parliament, the following comment on the Edmonton coal is found;

> "This coal occurs in three or four beds, the principal of which is from four to six feet thick. It is of very inferior quality,aburns with no flame, but rather smoulders away leaving a plentiful ash. ... It is used in the forge at the fort and is found to answer tolerably well." (Spry, 1968, p. 202, notes).

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[2] John McDougall the trader, not to be confused with the Methodist missionary of the same name.

The Palliser Report has been criticized for presenting too negative a picture of western Canada. It may be that, in writing official reports, the expedition members preferred to make conservative estimates concerning the possible value of the resources of the North West.

Settlers Before 1892:

Until the 1870's settlement in the North West was limited to a few Metis groups at mission stations such as St. Albert. These settlements were sponsored by churches and were aimed at persuading the Metis to give up buffalo hunts and adopt a sedentary way of life based on agriculture. The successful gardens of the Hudson's Bay Company and the missionaries demonstrated that agriculture was a practical activity some time before the main agricultural settlement of the area.

The first true settlers in Edmonton seem to have arrived there almost by accident. Some of them came as traders and established stores in competition with the Hudson's Bay Company. Gold could be panned from the bars in the river during low water and this drew a number of miners returning east from the Cariboo.[3] Others drifted into the area, found it attractive and squatted on a piece of land. Growth was encouraged as these people wrote to family and friends in the

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[3] One group of gold-seekers, the 'Overlanders', passed through Edmonton on their way to the Cariboo in 1862. Some of them were sufficiently impressed by Edmonton to return as settlers, and in some cases part time gold miners, when the Cariboo rush ended.

east describing the advantages of the country and encouraging them to move west. Growing land hunger in southern Ontario was forcing people to think of moving to the prairies and a few of them finally arrived in Edmonton. Gradually the character of the settlement changed from an outpost of the fur trade to a pioneer agricultural settlement and regional service center.

The Early Coal Mines:

Since the Hudson's Bay Company had already established the practice of digging coal from the river banks, it was natural that the newly-arrived settlers would do likewise. By this time it was possible, although expensive,to get coal burning stoves and stove pipes. Beach (1934, p. 28) quotes W.G. Ross, an early settler, as saying that many people were mining coal for their own use in the banks of the Saskatchewan River by 1874. Canon Newton of the Anglican Church came to Edmonton in 1875 and spent the winter of 1875-76 without proper accommodation. He wrote;

> "This stove was not sufficient to warm the room and it needed perpetual attention night and day with the slight wood of the country to keep us from freezing. ...Neither coal nor oil could be bought ... (Newton, 1897, p. 20).

This comment is interesting for two reasons. It brings out the problem of the inadequate local wood supply and it also makes it clear that mining was not yet on a commercial basis, although the reference to coal indicates that it was known and used by the settlers.

Sources disagree on who opened the first commercial coal mine in Edmonton and where it was located. No data has been found for the years immediately preceeding 1880-81. In December 1880 the Edmonton Bulletin began publication and subsequently enough information regarding the coal mines was reported so that it is possible to piece together an account of their activities.

Items in the Bulletin indicate that at least three and possibly four small mines were operating in the Edmonton area during the winter of 1880-81.

> "The H.B.C. has let a contract to Alex Robinson [may be Robertson] for taking out 200 tons of coal. It will be taken out of the bank on Mr. Groat's property." (Edmonton Bulletin, Dec. 6, 1880 1880).

On December 20, Messrs. Robertson and McDonald were reported to be mining coal for the Company from the bank opposite the Edmonton Company's mill. On January 31, 1881 the Bulletin noted that the Imperial Coal Mining Company of McDonald, Annand and Yates, had a drift in thirty feet and that the Zero Company of Robertson and Humberstone was putting up a building on the opposite side of the creek (probably Mill Creek). Both companies had contracts with the Hudson's Bay Company as did Donald Ross who was working in the main river bank just west of Mill Creek (MacDonald, 1954, p. 221). Ross was to provide one hundred tons of coal for the steamer "Lilly". The other two contracts may have been to provide coal for a fifty horse power steam saw and grist mill which the Company was putting into operation. Sheds were built by

Figure 5: Three 'gopher hole' mines, two or which are apparently abandoned and much fallen in, in the bank of the North Saskatchewan River at Clover Bar.

the Company for the storage of the coal.

William Humberstone is sometimes named as the first commercial coal mine operator in Edmonton. More frequently Donald Ross is given this distinction. Horan (1945, p. 95) and MacGregor (1967, p. 92) both give the location of Ross's first coal mine as being on the north side of the river near McDougall Hill, but items in the Edmonton Bulletin indicate that this drift was not opened until 1883. By this time, Ross[4] had already developed a considerable interest in the coal business, working a seam on the south side west of Mill Creek. It is impossible to make any definite statement as to who the first coal mine operator actually was; both Ross and Humberstone have already been mentioned as being in the business in 1880. From the amount of activity during the winter of 1880-81 it would seem likely that some commercial mining had been done in the preceeding years. Thus commercial coal mining in Edmonton can be said to have begun between 1875 and 1880.

In 1881 coal cost $4.00 per ton at the pit mouth or $4.50 per ton delivered. At the same time the Edmonton Milling Company was paying $1.50 per cord of wood delivered, so that coal was expensive, both relatively and actually. Demand was sufficient to keep the coal drifts working steadily

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[4] Both Donald Ross and John Walter were very active in the early phase of coal mining in Edmonton, but both are remembered for their other activities, Ross as the first hotel proprietor, and Walter as the ferry barge operator.

and to provide employment for a number of men who had come into the district during the previous season and who were not yet established. Coal was being produced at the rate of one ton per man per day.

The mining industry nearly had its first fatality in February 1881 when part of the roof of the Zero drift, which was not timbered, collapsed, just after Mr. Robertson had left the workings. Subsequently the Bulletin noted that the mine had been "run in" about fifty feet and was well timbered. This drift was closed in mid-March after producing about seventy tons of coal.

The Imperial drift was "run in" at least eighty feet and filled its one hundred ton contract with the Hudson's Bay Company. The Bulletin estimated that over seven hundred tons of coal were taken out in the vicinity during the winter (Edmonton Bulletin, March 7, 1881). It is difficult to determine exactly who produced how much for whom, but at least half the total output was for the Hudson's Bay Company.

The Company was also responsible for an early strip mining operation in the area. Late in February 1881, nine men were sent to Big Island ten miles upriver from Edmonton to remove overburden from a thick coal seam of good quality referred to as the Mammoth seam (Beach's number nine seam). The intent was to strip the seam in such a way that the steamer could tie up to the bank and load directly from the seam. The men stripped an area fifty-two feet by twenty feet and sixty feet deep at the back. There is no direct

evidence as to how successful this idea was, but it may be significant that for many years after the summer of 1881 the steamers on the North Saskatchewan used wood exclusively.

Not all of the coal mined during the winter of 1880-81 was used immediately; steamboat usage in particular was not as great as expected, and residents were pleased to discover that coal which had stood all summer without protection was still fit for use the following November.

Most of the coal mined in 1880-81 came from the south side of the river and was brought across the ice in sleighs. In December 1881, Humberstone opened a drift on the north side and built a road up the face of the river bank so that coal could be hauled to customers in the main part of town at any time of year. Later he opened a second drift a few yards below the first one. During this winter Hardisty and Fraser's mill (The Edmonton Milling Company) switched to coal, and Humberstone and Robertson got the contract to supply coal which they took from the near-by Zero drift. They produced about fifty tons for the mill and ran the drift back seventy feet, again without timbers. Since these early drifts tended to cave in soon after abandonment, this was probably not the Zero drift of the previous winter but a new one run in close by and parallel to it.

Coal sold at $4.00 per ton delivered until mid January when the rumour of a proposed "duty" on coal of one dollar per ton caused the price to rise to five dollars.

An editorial in The <u>Edmonton Bulletin</u> of January 28,

1882 helps to clarify the development of the coal mining industry up to this time;

> "Six different coal drifts have been worked in a distance of about a mile and a half along the banks of the river on each side of the Fort. The furthest up is on Mr. Groat's property on the north side of the river, the coal from which was used by Dr. Verey and Ed. McPherson last winter. The next is on the same side of the river ...at the new steamboat landing. This never was worked much how-ever, a little having been used in the Fort black-smith shop ...The third drift was opened last fall directly under the town by Mr. Humberstone and the coal from it is considered the best from any of the drifts near town. ...On the south side of the river ...and Ross opened two drifts last winter having kept a gang of six men employed. Both the upper and lower seams were worked but although the coal of the lower seam was of a firmer quality than that of the upper one, it could not be worked to as good advantage on account of the seam dipping below the level of the river ...The other two drifts were worked last winter to get out coal for the H.B.C. steamers and are on opposite sides of a small creek on the south side of the river oppo-site the mill and were each carried in about 100 feet ...Besides these there is a seam about four miles down the river which has been worked and the coal found to be of good quality."

Quite an extensive market for coal was developing. It was being used for domestic heating and cooking, to pro-vide power for the mills, during one summer to raise steam on the riverboats and by William Humberstone in his kiln, brickmaking being his summer occupation.

Mining resumed in the fall of 1882 with Robertson and McLean working a drift on Donald McLeod's property near the Edmonton Mills. They mined 270 tons before warm weather in mid-March made the drift too wet for working. The drift operated by Moore, Ross and Dennis was operating with two shifts of three men each, and reached a production rate of

eight tons per day. The coal was mined with a pick and shovel (see fig. 8 ) and brought out in a wheelbarrow. The room and pillar system was not yet in use so working space was restricted to the coal face at the end of the drift. Larger crews could not be used as the men would have got in each others way. In this mine a second tunnel was started using the same entry as the first but branching to the left downstream. It is not stated whether or not both drifts were worked at the same time. If they were, this would represent an advance over the single drift method as two crews could be employed simultaneously and output doubled. About 200 tons were taken out before the drift was closed down in the spring. Ross had built a coal shed near the river capable of holding 325 tons of coal which he planned to send to Battleford and Prince Albert during the summer.

The Edmonton Mills had switched to using coal exclusively during the winter. It had proved cheaper and more efficient than wood. Wood was costing three to four dollars a cord delivered while the price of coal remained at four dollars a ton.

During the winter of 1883-84, Ross opened a drift on the north side of the river near the foot of the grade to the Edmonton Hotel. This is probably the drift referred to by MacGregor and Horan as the first coal mine in Edmonton. The seam was not visible in the river bank at this point and some elementary surveying techniques were used to extend the

drift back seventy-five feet until it intersected the coal seam. Later that season Ross opened a drift in the lower seam[5] on the south side. Thus he was able to serve the market on both sides without having to haul across the river.

Humberstone was also mining coal although it is not clear from which drift, and J. McKernan opened a drift on his claim on the south side. All this competition forced the price of coal delivered down to three dollars a ton and moved the Bulletin to compare the situation in Edmonton most favourably with that in coal-less Regina (Edmonton Bulletin, Dec. 1, 1883). According to the Bulletin, about 400 tons of coal were used in Edmonton that winter (Edmonton Bulletin, Jan. 5, 1884). Mining ceased by the beginning of April.

In the summer of 1884, steamboat rates on coal to Battleford were "$12 per ton, the coal to be sacked." The Bulletin did not think that this was "likely to boom the coal trade much." (Edmonton Bulletin, March 29, 1884).

The coal mining industry did not make much news during the winter of 1884-85. The price of coal rose to four dollars per ton. The Hudson's Bay Company began taking out their own coal from a seam almost directly below the fort and G.A. Simpson opened a drift on the bank of the river on his claim. Presumably Ross and Humberstone also mined coal as the demand warranted.

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[5] This appears to be Beach's number five seam which he says was never mined.

In October, 1885 the North West Mounted Police called for tenders on seventy-five tons of coal for the Edmonton detachment. The contract was awarded to Donald Ross who was to supply the coal at $3.50 per ton. Tenders for a similar amount were called for regularly in succeeding years. In 1886 Ross won the contract for seventy tons at $3.65 per ton. In 1887 John Walter got the contract, which was for seventy-five tons. In the summer of 1887 the Police called for tenders to supply three hundred tons of coal to the detachment at Battleford. Humberstone and M. McCauley offered to supply coal at $18 per ton delivered. The bid was rejected as being too high. The <u>Bulletin</u> pointed out that the tenders should have been called for much earlier in the year so that the coal could have been mined in the winter while labour was still cheap and shipped in the late spring while the water was still high (<u>Edmonton Bulletin</u>, July 23, 1887).

The winter of 1885-86 was an unusually cold one (<u>Edmonton Bulletin</u>, January 9, 1886) and the <u>Bulletin</u> commented on the advantages of having coal readily available at $3.75 per ton delivered. The <u>Bulletin</u> also noted that, due to the increased use of coal, less wood was burned in town than during any previous winter. Malcolm Groat mined coal for his own use on his own property and E. Caverhill worked the seam on McKernan's claim on the south side.

In the fall of 1866 Donald Ross was working a drift on the Methodist Mission property (River Lot 6) and F. Sache and John Walter opened a drift on Sache's claim on the south

side. John Walter was already operating a ferry scow across the river during the summer so it was logical that he should establish a wire rope ferry from their coal pit on the south side to Ross's Flat on the north. Coal was loaded down a chute from the mine into the scow and reloaded into wagons on the north side. Photographs (see fig. 6 ) taken at Milner's and Stewart's mines in 1908 show coal being loaded into barges, so that moving coal locally in the summer by barge evidently became a common practice. Around 1900 some of the mines east of the city were reported by the Mine Inspector to lack road connection with the community. Some of these mines were abandoned, at least temporarily while others stockpiled their coal until cold weather made it possible to move it upriver in sleighs. Some of these may also have moved it by barge in the summer but it was not reported except in one case. Mine no. 17 was opened at Big Island with the intention of bringing the entire output to Edmonton by barge but the attempt was unsuccessful and the mine closed within a year.

In 1887 Walter and Sache began mining from a seam of hard bright coal three feet thick but only four feet above the river. This mine flooded as soon as warm weather set in.

The Edmonton Bulletin (Jan. 7, 1887) estimated that during 1886 about 1,200 tons of coal were mined in Edmonton. Fraser and Company's mill consumed three hundred tons, one hundred tons was shipped to Battleford and the remainder was used in the town.

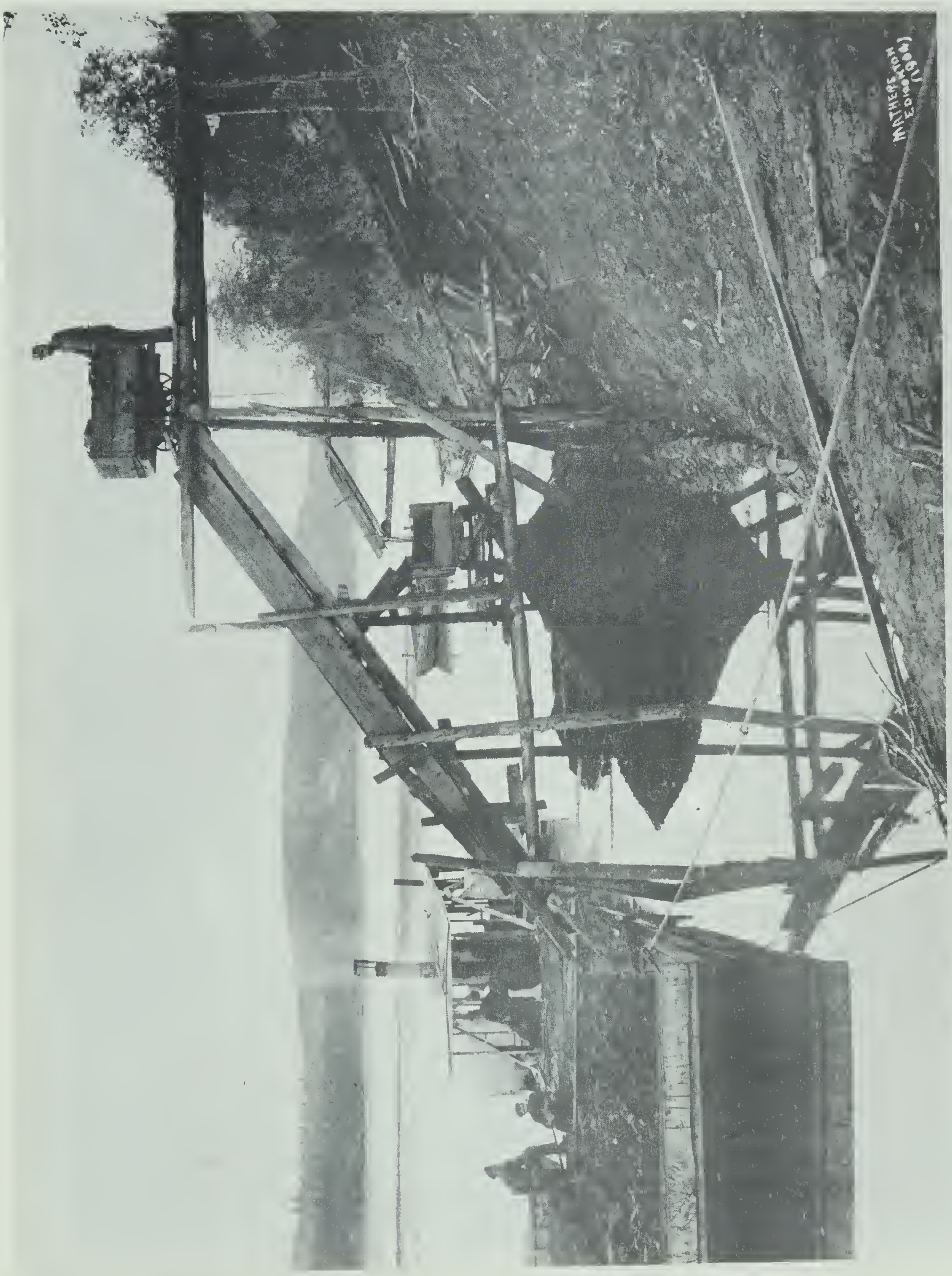


Figure 6: Loading coal from Milner's mine into barges on the river.
Note the paddle-wheel tug boat attached to the barge.

Figure 7: Winter delivery by sleigh and team of horses. The load is lump coal, about two tons.

By 1887 the price of coal delivered was from $3.25 to $3.50 per ton. Five mines were being operated within what were considered the town limits. Humberstone, Ross and Frank Hall had mines on the north side. A sixth mine was opened that year by W.T. Rees on K. Macdonald's property on the north side. This drift had to be abandoned the following year when water entered it, but a new drift was opened on the same property in a different place.

In the summer of 1889 Donald Ross constructed an air shaft from his coal drift (probably the one 'run in' by survey in 1883) to the surface to improve ventilation in the mine. This is the first instance of a mine operator in Edmonton employing mining engineering techniques. It indicates that the drift must have extended farther than most others to require the additional ventilation and that he was keeping the same drift in production for more than one season. This would make it the first true mine in the Edmonton District, as opposed to the one season 'gopher holes'.

Early mining practice was extremely crude, some mines even being extended without timbers. The drifts followed the coal strata which were horizontal, so that gravity drainage was inadequate and water was a problem. There were apparently no pumps used. There may not have been any available, and with the difficulties involved in transporting heavy goods to Edmonton at this time, importing one would have been expensive. Operators may not have cared to make this kind of an investment in a seasonal operation. The

Figure 8: The working face in Milner's coal mine

mines in the Edmonton area were never seriously troubled by explosive gas so open lights were regularly used. No fatal accidents are recorded for this early period, which was rather surprising in view of the total lack of safety measures.

By 1890 a number of drifts had been opened in the banks of the North Saskatchewan and the tributary streams within the limits of the present city. Most of these drifts were less than one hundred feet in length and were abandoned after one season. Surficial evidence of their existence soon disappeared. They did disturb the strata and contributed to slumping along the river bank but neither of these facts were considered important at the time and no effort was made to keep a record of the location of these drifts. In later years, new mines frequently encountered old workings and the engineering problems presented by them were sometimes sufficiently serious to put the new mine out of business.

Coal as Freight on the North Saskatchewan:

Until the Calgary and Edmonton Railway was completed in 1891 the only way of getting goods to or from Edmonton was over roads or by river steamer, both of which were unusable in different seasons. River travel was best during the early summer while the water level was still high, a time when the roads might be impassable quagmires. When river travel was poor during the dry summer and autumn, road travel was usually good, so the two systems complemented each other to a certain extent. Freight costs made it impossible that a commodity with a low value-to-weight ratio such as

coal could be moved far beyond the immediate Edmonton area by wagon. Donald Ross did send several loads of coal to Fort Saskatchewan but it is not clear whether he sent them by land or water (Edmonton Bulletin, Nov. 10, 1888). The real markets were in Battleford and Prince Albert and other communities developing along the North Saskatchewan, but, despite their determination, Edmontonians never solved the problem of how to transport the coal downstream.

The obvious means of transporting coal to downstream markets was by the river steamers. The first steamer to reach Edmonton, the "Northcote", arrived in 1874. After this year a steamer navigated all the way upstream at least once a year except in 1889, a year when the water level was unusually low. Not infrequently the steamer arrived with half or less of her cargo, the remainder having been unloaded and cached along the river bank to reduce the boat's draught.

In fact the North Saskatchewan has never been a truly navigable water way. Dr. Hector noted that the brigade leaving Fort Pitt on May 22 took seven days to reach Fort Carleton, a distance of about 190 miles. the York boats, which drew one and one half to two feet of water, were constantly aground (Campbell, 1950, p. 255). Later, General Middleton provided an interesting description of steamboating on the North Saskatchewan;

> "On the 5th of May 1885 the long expected steamer arrived after a tedious journey, most of which seems to have been made on land. All the steamers

on this river are sternwheelers and have four strong spars fastened, two on each side of the bow, by a sort of hinge. These spars are kept triced up until the vessel runs on a shoal or sand-bank - which are many and shifting - when they are lowered and the vessel is forced over the obstacle, made to walk over as it were." (Campbell, 1950, p. 252).

At first the freight rates were prohibitive; six and one quarter cents a pound was charged to and from Winnipeg. To ship a ton of coal would have cost $125. When the rate to Battleford was set at $12 per ton, some coal did move downstream by steamer. For example; "Steamer "Manitoba" left on Wednesday ...taking five tons of coal for Prince Albert." (Edmonton Bulletin, Aug. 18, 1883). "The "North West" left on Wednesday forenoon taking down ...60 tons of coal from A. MacDonald and Co. for Battleford." (Edmonton Bulletin, July 10, 1886). "The "North West" left on Monday ...ten tons of coal for the H.B.C. at Prince Albert." (Edmonton Bulletin, Aug. 14, 1886).

A small steamer, the "Minnow" originally built for the Galt coal interests in southern Alberta, pulled coal barges up and down the North Saskatchewan for a number of years with some degree of success, but, according to one source, bankrupting her owners, Lamoureux Brothers, in the process (Wickenden, 1957, p. 13). Lamoureux Brothers operated a timber limit upstream from Edmonton and at times dug coal from the seam at Big Island. In 1887 they successfully delivered sixty tons of coal to the Indian industrial school at Battleford by barge. The following year they bought the

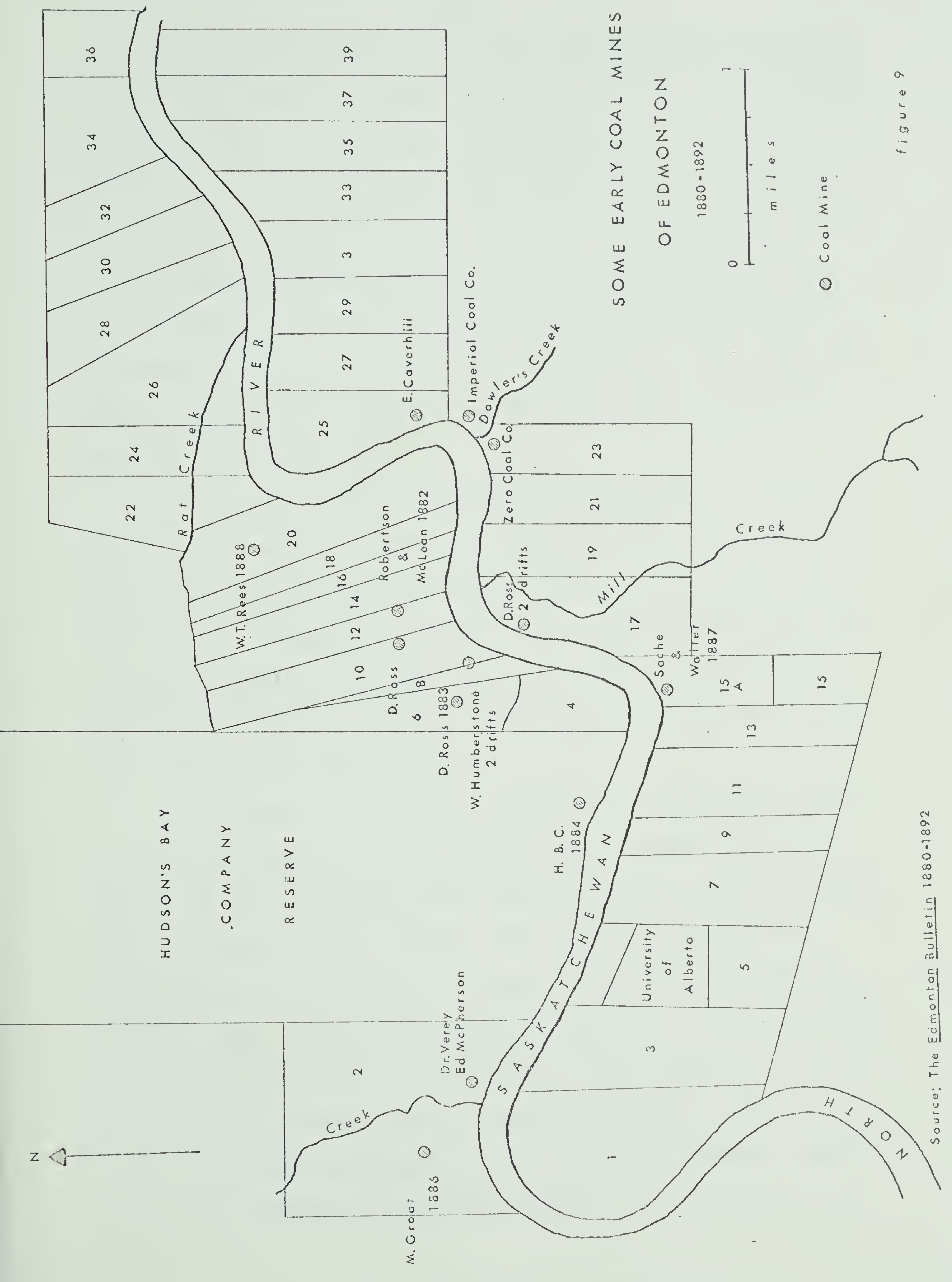


figure 9

Source; The Edmonton Bulletin 1880-1892

"Minnow" and began towing barges of coal to Battleford. The "Minnow" completed one round trip that season. On her second trip downstream in September with sixty tons of coal she got stuck at the mouth of Sucker Creek and had to be hauled out on the bank for the winter. No further mention of the "Minnow" in the Edmonton Bulletin is found until 1899 when it was moving coal for the Fort Saskatchewan Milling Company. Wickenden (1957, p. 14) says she continued to haul coal and lumber barges for a number of years until she ran aground and was destroyed by ice.

The most ambitious plan for moving coal on the river was put forward by R. Dearon of Prince Albert who wanted to move 700 tons of coal from Edmonton during the summer of 1889 using a tug being built for the Prince Albert Tug Boat Company (Edmonton Bulletin, Feb. 16, 1889). The tug was launched in the spring but it never arrived at Edmonton and no coal went to Prince Albert.

A number of attempts were made to take coal to Battleford by barge. In 1882 Donald Ross financed the construction of a flat boat measuring fifty feet long by twenty feet wide and drawing twenty-five inches of water when loaded with fifty tons of coal and seven thousand feet of lumber. This vessel started for Battleford on July 19, 1882 and arrived on August 11 "with all of the lumber and part of the coal she started with." (Edmonton Bulletin, Aug. 12, 1882). In future attempts of this kind of shipment, smaller barges with lighter loads were used.

In August 1888, J.W. Hayes with five men took three barges, each thirty-six by fourteen feet and carrying twenty tons of coal downriver. They started late in the season when the water was low, ran on to sandbars and had to dump part of the cargo. They finally delivered twenty-five tons. In reporting this trip the Bulletin commented that; "If the people of Battleford could be certain of being supplied with coal at a fair price, they would fit up coal stoves and a good trade could be worked up, but at present only a few have coal stoves and therefore the demand is small and uncertain." (Edmonton Bulletin, Sept. 22, 1888).

In 1890 C. Sandison and M. Mcleod got the contract to supply the Battleford industrial school with sixty tons of coal. They started in early July with three barges, each sixteen by thirty feet and drawing twenty-three inches of water, and a total cargo of seventy-five tons, all of which was safely delivered.

With the exception of that shipped by Donald Ross, all of the coal sent to Battleford came from the Big Island seam. This may have been due to the better quality of the coal, to the ease of loading from the seam directly into the barges, or to some other factor. From the foregoing discussion it is clear that the shipment of coal downriver never reached the status of a successful industry.

The Calgary and Edmonton Railway:

When the proposed route of the Canadian Pacific Railway was changed to pass two hundred miles south of Ed-

monton, the growing communities in the North Saskatchewan district were left isolated and faced with the prospect of stagnation as the incoming wave of settlers was diverted into the southern part of the prairies. The people of Edmonton were determined that their community would not remain in an inaccessible limbo. In July 1881 the tracks of the Calgary and Edmonton Railway were laid to the south bank of the river, thus establishing the basis for the rival city of Strathcona. The railway made it much easier for settlers and goods to come into the district and it made a much wider market available to the established population.

On August 2, 1891, the Edmonton Bulletin noted that D.C. Robertson had shipped a car load of coal (probably about thirty tons, the capacity of the boxcars regularly in use at that time) from Ross's coal mine to the Calgary Cartage Company in Calgary. This was a trial shipment to determine whether Edmonton coal could compete with that from the Lethbridge and Drumheller fields. The consignment met with a mixed reception. Used for raising steam in the powerhouse at Calgary it was pronounced technically satisfactory but not economic because it burned too quickly. Of those who used it in stoves, some thought it inferior and some superior to the Galt coals (Edmonton Bulletin, Sept. 12, 1891). By December, 1891, Robertson was sending two car loads a week to Calgary.

In September, 1891, two and one half tons of coal from the Humberstone mine were used on a trial basis in the

C. & E. locomotive to test its steam raising quality. The engineer reported that compared to the Lethbridge coal, more of the Edmonton coal was needed to raise a specified amount of steam and that it was harder to stoke. On the other hand, it left no cinders, unlike the Lethbridge coal (Edmonton Bulletin, Oct. 10, 1891). Higher cost per pound of steam raised plus the need to 'coal' more frequently, prevented the railways from using Edmonton coal in their main locomotives, although it was used in the yard engines. When the mountain mines with their harder coal were opened, they captured the entire railway steam coal market. The domestic grade coal fields sold coal to the railways for use in heating stations, roundhouses and other buildings as well as for use in the yard engines.

Conclusion:

Until the railway made it possible to tap a wider external market, and an increased flow of settlers enlarged the local market, the Edmonton coal mines were 'gopher holes', employing few men and using simple equipment to achieve a small output. Mining technology was almost unknown. The drifts were short and sometimes poorly constructed. Operations were usually located close to the intended market or where an easy path up the riverbank was available. Some of the drifts were started on land claimed by the operator (until the Dominion Land Surveys were carried out during the late 1880's none of the settlers had title to their land; they were squatters) and some of them were started, apparen-

tly by agreement, on land claimed by another settler, and probably with some form of remuneration to the land claimant. But there are no records of such arrangements. Most mines were started into a visible coal outcrop.

Production fluctuated in direct response to local demand, being high in cold weather and decreasing as the weather got warmer. Acute shortages seem to have been rare but this may be because anyone in real need of coal could dig for himself a wagon load of low quality but burnable coal from an outcrop.

Opening a wider market did not eliminate the casual or small scale operator but it did gradually lead some of the more enterprising operators, particualrly those working in the thicker and better grade seams to enlarge their operations, put them on a more stable economic basis and work them more in accordance with good mining engineering practice. It also led to an increase in the number of mines and an increase in output per mine. These aspects will be discussed in the following chapters.

# CHAPTER III

## THE EDMONTON COAL FIELD SINCE 1892

The construction of the Calgary and Edmonton Railway ended the isolation of the Edmonton district and opened up markets for Edmonton produce in the south. On the other hand, increasing numbers of settlers moved into the area and claimed homesteads. The railway tracks stopped on the south side of the river and were not extended to the north side until 1902. For ten years the south side community, called at first South Edmonton and later Strathcona, had this advantage over the community on the north side and, with the rapid growth of the south side community, an enduring rivalry developed between them. Coal mines operated on both sides of the river and at Rabbit Hill south west of Strathcona. Those on the south side, particularly the White Star Mines at Rabbit Hill, developed a trade with places to the south along the railway such as Innisfail, Olds, and Calgary. The expansion of the market led to the development of new mines and the more intensive working of those already in existence. Enough was known about the coal formations that most of the development took place in the Clover Bar seam where the seam was thicker, the coal of better quality and the roof more secure than in the Edmonton top seam in which the original 'gopher holes' were developed.

Early Effects of the Calgary and Edmonton Railway:

Almost as soon as coal began moving over the line to Calgary, there were complaints about the freight rate. The first rate offered by the railway was $3.60 a ton to Calgary. Coal could not be sold in the Calgary market at a price which would cover this rate. When the rate was reduced to $2.30 a ton, Edmonton coal became saleable in Calgary (Edmonton Bulletin, Feb. 13, 1892). Other places such as Moose Jaw made enquiries about obtaining Edmonton coal but at this stage, freight rates to those points were too high.

During the winter of 1891-92, twelve cars of coal were shipped south, ten to Clagary, one to Red Deer and one to Innisfail (Edmonton Bulletin, April 16, 1892). During the winter of 1892 coal mines were developed along Whitemud Creek about six miles south of Strathcona. The coal in the seam being worked was thought to be more like that found in the seam at Big Island than like that mined from the river banks in town. It was hauled by sleigh or wagon four miles to Otoskwan or Black Mud Siding (now called Ellerslie) eleven miles south of Edmonton. In early 1894 at least three different mine operators were involved in a dispute over a shortage of boxcars at this siding. Apparently more coal could have been shipped and sold if the railway had provided the rolling stock to haul it. These mines collectively became known as the White Star Mines.

A change in attitudes and in mining technology by

mine operators can be detected at this time. Whereas the early coal mines had often been worked for one season and abandoned, mines were now being regarded as a long term proposition worth the investment of labour and capital to improve production. The improvements to the Ross mine have been described. The Rees mine had also been operated continuously for a number of years. It extended over 300 feet under the bank and during the summer of 1892 the owner was putting in a ventilator, improving the track and improving the drainage (Edmonton Bulletin, Aug. 8, 1892). When Rees died two years later, this mine was continued in operation at first by S. Moran and later by John Milner. The first mine worked by the convicts from the penitentiary was a further development of this same mine. Long term operation of these mines must have produced substantial mined-out areas of which there are no plans.

The most interesting aspect of the coal trade at this time was the development of the southern market. Twelve cars of coal were shipped during the first winter. In the fall of 1892 the Bulletin remarked that "D.C. Robertson has sold 500 tons of Edmonton coal to H. Lindsay of Calgary." (Edmonton Bulletin, Oct. 20, 1892). In January, 1893 "Edmonton coal is being delivered in Calgary for $7.00 a ton, only one dollar less than hard coal from Canmore. Eight car loads have been shipped already and a car load is being shipped by each train." (Edmonton Bulletin, Jan. 2, 1893). During the same winter a car and a half was shipped to

Wetaskiwin and a car to Innisfail. During November, 1893, nine cars of coal were shipped to Calgary, two to Innisfail and one to Lacombe. The price in Calgary was lower; $6.25 a ton. All of the coal going south came from mines on the south side of the river, and most of it came from the mines near Rabbit Hill. Between the first of January and the end of April, 1895, twenty-three cars of coal (about 700 tons) went south, of which twenty-one went to Calgary, one to Innisfail and one to Carstairs. Of these, all but one car was from Black Mud Siding (Edmonton Bulletin, April 29, 1895). In March 1896 the Bulletin noted that fifty-two cars of coal, all from the White Star Mines, had been sold in Calgary during the preceeding six months of fall and winter (Edmonton Bulletin, March 2, 1896). With trade well established the Bulletin ceased keeping count of the cars and began complaining instead of the shortage of boxcars and the resulting accumulation of out-bound freight. Besides coal the area was producing livestock, garden produce and some grain, particularly oats. The producers were anxious to sell their surplus in the drier south where these commodities were in demand.

By 1898 the completion of the Crowsnest Railway enabled coal to be shipped in to the Calgary market from that field and for a time Edmonton coal was uncompetitive (Edmonton Bulletin, Dec. 27, 1898). From October 1899 to February 1900 fifteen cars of coal were sent from the Edmonton area compared with the fifty-two cars of 1896, proof that Edmon-

ton coal was again not doing well in the Calgary market.

Shipment via the North Saskatchewan:

Some coal still moved on the river. Charles Sandison retained the contract to supply coal to the Indian industrial school at Battleford. In 1892 he took one hundred tons of coal by flatboat, sixty tons for the school and forty tons on speculation. In the summer of 1893 he took down 120 tons the same way, seventy-five tons for the school and the remainder for general sale. In 1894 the government contracted for 200 tons of coal to be delivered at Battleford. The steamer "Northwest" loaded 150 tons of coal from Humberstone's mine[1] (Edmonton Bulletin, July 6, 1894). The heavily laden steamer had a difficult trip down river, being stuck on sand bars on a number of occasions. This trip did not provide much encouragement for those advocating the movement of coal by riverboat.

The steamers ceased to ply the North Saskatchewan but locally, steamers could still be found upon the river. An early photograph (published in The Pegg, professional engineer, geologist, geophysicist; Jan. 1971, p. 4) shows the "City of Edmonton" steaming past the site of the Macdonald Hotel. This boat apparently belonged to John Walter and was used for pleasure outings on the river. Barges moved coal from the north to the south side and vice versa and may

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[1] According to the Edmonton Bulletin (June 7, 1984) the original intention had been to load the coal from a seam twelve miles up the river, probably at Big Island.

have carried coal down to Fort Saskatchewan. The old Black Diamond Mine at Clover Bar moved its coal by barge and also provided coal for steamer use (Western Canada Coal Review,[2] Aug. 1923, p. 37).

Expansion of the Coal Mines:

Brief comments in the Edmonton Bulletin indicate that a number of new coal mines were opened in response to the expanded market and a number of old ones changed hands. For example; "S. Moran has opened a new coal mine on River Lot 12, Edmonton," (Edmonton Bulletin, Oct. 20, 1892). F.C. Armstrong has opened a coal drift just above the lower ferry landing in town." (Edmonton Bulletin, Nov. 21, 1892). "Norman Luse has opened a coal mine on F. Sache's property, South Edmonton." (Edmonton Bulletin, Nov. 12, 1894). "Newton Egge has opened a coal mine on J. Dowler's claim, south side." (Edmonton Bulletin, Dec. 13, 1894). A year later W. Humberstone purchased an interest in this coal mine, thereby enlarging his coal mining interests which were already substantial. Comments in the Bulletin are disjointed, but it would appear that two separate interests had mines on the Dowler property, that of Baldwin and Egge, Baldwin's interest later being wought out by Humberstone, and that of Steeves and Herbert who were opening a mine in a four foot thick seam in the spring of 1896.

In the fall of 1897, a new coal mining development

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[2] Hereinafter referred to as the W.C.C.R.


Figure 10: The Humberstone Mine in 1902. This is Mine No. 6 in the north bank of the river below the site of the Macdonald Hotel.

was noted at Egg Lake Creek north of the Sturgeon River[3]. Five mines were being worked and coal could be bought at the pit mouth for one dollar per ton. One operator, Frank Smith, advertised in the Bulletin that he was prepared to deliver in Edmonton for $2.50 per ton. The price of coal in Edmonton during the winter of 1895-96 with several mines operating, plenty of cheap labour available and stagnant economic conditions in the area generally, dropped to one dollar per ton delivered. This is an early example of the over-development of the coal fields, chronic throughout the coal producing period, attributable to lack of regulation as to who could open a mine, and the direct cause of so many mine failures. In 1895 nine mines employing about thirty-five men were in operation to serve a population of about 1,670. On the other hand, when the winter of 1899 set in early and with unusual severity, no stockpiles of coal were on hand to meet the sudden heavy demand, the mines were not in operation and mine labour was scarce due to the improved economic conditions which followed the completion of the railway. The result was a coal shortage in the immediate area.

In at least two cases, companies employed in other business opened their own mines to supply their requirements. The Fort Saskatchewan Milling Company opened a mine at Scheidam's Flats, about five miles below Edmonton,[4] and took

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[3] This would be the present-day Cardiff - Carbondale area.

[4] This would be in the area of the present-day Highlands Golf Course and a precursor of the mining village of Beverly.

the coal down to the mill aboard the oft-refitted "Minnow". In September, 1899 this mine was severely damaged by high water and the storage bunker with thirty tons of coal slid into the river (Edmonton Bulletin, Sept. 11, 1899). In 1900 Gallagher and Hull Co. opened a mine on their own property on the south side, the coal being intended for their own use.

In 1906 twenty-three mines were reported to be operating in the area and by 1908 the number had risen to thirty. The winter of 1906-07 was one of the longest and coldest on record and for once the mines operated to capacity for the entire season (Horan, 1945, p. 164).

Danger in the Early Mines:

Men died in the Edmonton coal mines, not as often as one would expect from reading the reports of the Mine Inspectors concerning violations of safety regulations. For example, in his report on Mine No. 15 in 1898, Inspector Evans reported bad ventilation with the work area infested with black damp[5] and the main tunnel in danger of caving, and recommended that the mine be closed (Mines Branch File No. 15). This suggestion was made rather frequently during the early mining period, but the threat of closure seems to have been an empty one. The Mines Department did not seem anxious to institute the legal proceedings necessary to force closure

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[5] Carbon dioxide.

and if it did take the matter this far, the obdurate owner could abandon the drift in question and start a new one a few yards away, which he probably intended to do in any case.

The greatest single loss of life in an Edmonton District mine occurred on the night of June 8, 1907 when five men working underground on the night shift and the mine foreman who went down to warn them, were burned to death in the Strathcona Coal Company Mine.[6] The headframe and most of the surface buildings were destroyed but the mine was put back into operation within a few months. The owners were censured for having the main shaft and the air shaft much too close together, so that both were within the fire area and the men could not get out by either of the only two exits without coming through an inferno.

There were a number of fires in the Edmonton coal mines. Some of them involved only the surface structures such as the tipple which were always made of wood and burned easily, and some of them involved the underground workings themselves as the coal seams ignited. These occasioned considerable property damage but never again was there any such loss of life. Hazards to life and limb usually involved

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[6] This mine is sometimes referred to as Walter's Mine, John Walter being one of the owners. The mine entrance was just east of the High Level Bridge and just below the bank where the Strathcona House apartment building now stands. There is no historic plaque to mark the location or the event but some concrete-and-stone blocks and two rectangular depressions in the ground may be relics of the mine.

being struck by a piece of falling coal, being caught in a cave-in, being caught in the hoisting gear or being crushed by the mine cars.

Extent of the Unrecorded Mine Workings:

Another interesting observation recorded in the Mine Inspectors' reports, is the frequency with which mines beginning operations around 1898-1900, encountered workings of old mines of which there were no records and about which the local inhabitants had apparently forgotten. For example; Mine No. 5, River Lot 12, "In this mine they have had great difficulty in contending with old workings which they struck and did not know of their existence, also so closed in that they cannot be followed, making it extremely difficult to know where to strike for solid coal." (Report of Inspector F.B. Smith, Nov. 4, 1901, in the Mines Branch File).[7] Mine No. 9, Sect. 18, Range 53, Twp. 23, "Mine had tapped old workings at several points, workings are fairly extensive." (Inspector's Report, Oct. 12, 1906). Mine No. 10. River Lot 12, "Mr. Milner has had a great deal of trouble this winter in passing through old workings and on this account has made little progress in shipping coal as yet." (Inspector's Report, Feb. 23, 1902). Mine No. 12, "A long side drift has been made and part of the way it has been driven through an old closed mine." (Inspector Evans' Report, Feb. 9, 1899). "I found the conditions much the same as in Mar-

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[7] All of the Inspectors' Reports are in the files of the Mines Branch which correspond to the number of the mine.

tin Brothers mine, coming in contact with old workings of which there is no record or plan." (Inspector Smith's Report, Nov. 4, 1901). This was a new opening by different operators on the same property as that referred to in Inspector Evans' report. Mine No. 16, S.E.$\frac{1}{4}$, Sect. 17, Twp. 55, Range 24,; "Old fallen in mine exists between drifts one and two which are one hundred feet apart." (Inspector's Report, n.d.). With the gradual accumulation of knowledge about early mining activities by the Mine Inspectors and the requirement that all mines furnish a final plan of their workings at the time of abandonment, the likelihood of a new mine striking old unknown workings decreased.

Landslides Resulting from Coal Mining:

All traces of entries in the river banks were quickly erased by sliding of the bank. The usual notation at the end of a 'gopher hole' file is "abandoned, covered by slide." With reference to Mine No. 5 again, Inspector Smith noted in his report on Nov. 4, 1901, "It is at this point on the south side of the river that another great landslide has occurred and is no doubt in great measure due to the change of operators and having to start new works." Inspector Smith seems to be attributing the landslide to the mining activities. Photographs of a number of the mines taken around 1900 by Mather and by Earnest Brown show the drift openings set in the steep, sparsely vegetated river bank (see fig. 11 ). It appears quite likely that the mines did upset the precarious equilibrium of the river bank enough

Figure 11: The mouth of Milner's coal mine (Mine No. 74) at Clover Bar. This mine operated from 1903 to 1913. Note the size of the entry, all signs of which could easily be obliterated by a slide. Note the wooden tracks fcr the mine cars.


FRASER & FREMAN.
"BLACK DIAMOND MINE" EDMONTON.

Figure 12: Two entries of the old Black Diamond Mine. This mine eventually became one of the largest producers in the Clover Bar area. The mine area is now part of 'Refinery Row'.

to generate landslides. In reference to the old Humberstone Mine (Mine No. 6) near the Macdonald Hotel site, Smith reported; "This mine is practically finished as a great landslide has taken place and closed all the workings except a small drift taking out a few pillars." (Report, Nov. 4, 1901). This marks the beginning of the Grierson Hill problem which will be considered further in Chapter V.

Development of the Market:

The large increase in production and sales after the building of the railways and the reasons for it will be considered in detail in Chapter IV. Both the market radius and the population within the market radius grew rapidly during the first quarter of the 20th century as a vast and empty area was developed. Until natural gas became available, the only source of heat and power was coal and the demand for it seemed endless. Only once, in 1915, when a proposal to build a hydro-electric plant at Rocky Rapids, one hundred miles up the North Saskatchewan was accepted by city council, did the primacy of coal seem threatened (Mac Gregor, 1967, p. 216). This plant was never built.

Edmonton's population was growing so that, by 1893 there were 1,331 people according to the NorthWest Mounted Police census (Edmonton Bulletin, July 13, 1893). Besides the domestic heating and cooking market, the coal mine operators could also offer tenders to supply coal to the schools, the fire hall, the electric light company and the general hospital. The number and size of commercial buil-

dings was also increasing. While local coal was not used in the locomotives it was used in the section houses along the Calgary and Edmonton Railway. An improvement to the furnace of the electric light company made it possible to burn slack coal which reduced the cost of producing electricity and provided the mines with a market for this grade of coal which had previously constituted an unsaleable and dangerous nuisance (Edmonton Bulletin, Nov. 2, 1893).

There was some concern expressed from time to time that the city might go into the coal mining business itself. The city was the largest single coal consumer in the Edmonton District and coal deposits were known to underlie some areas to which the city held the surface rights (eg. Laurier Park). The closest thing to a public enterprise coal mine in the Edmonton field was the penitentiary coal mine, begun in 1909 and worked by inmates of the federal penitentiary from a drift in the river bank near the old Rees mine to supply coal for the penitentiaries at Edmonton and Prince Albert.

Before the penitentiary was closed in 1920, a 250 foot shaft was sunk to the Clover Bar seam. The rights to the coal were then leased by a group of local businessmen who formed the Penn Mine Coal Company,[8] the name apparently derived from the abbreviated form of penitentiary but with

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[8] The Crown Coal Company, sometimes mentioned in connection with the Penn Mine, was a coal distributing company owned by Mr. J. B. Starky through which he acquired ownership of a number of local coal mines, the Penn, the Chinook, the Kent, the Banner and finally the Star-Key Mine.

an extra 'n'. This was one of the most durable of the coal mining companies in the district, and one of the largest producers. It operated the mine on the penitentiary site and also the Chinook Mine. During November, 1929 which was generally a slow season, this mine alone produced 17,220 tons of coal, losing only one working day during the month (W.C.C.R., Dec. 1929, p. 38). The company was mechanized to the extent of having twenty-five trucks in operation for city delivery (W.C.C.R., Nov. 1929 p. 33). When forced to close the city mines in 1930 by legislation prohibiting the undermining of public works, the company acquired the Kelly Mine, Sect. 8, Twp. 55, Range 24 near Carbondale and continued operating until 1951.

Mines changed hands quite frequently. Small operations which were not financially rewarding to the owners were sometimes taken over by companies which had the financial resources to modernize and mechanize and introduce economies of scale. A company which operated one, two or even three mines with a substantial volume of production could bid for large contracts and guarantee delivery. For example, in 1923 the Humberstone Mine at Clover Bar was taken over from private ownership by the Humberstone Mines Limited, which improved the property. When working to capacity the mine could employ 200 men and produce 800 tons of coal per day (W.C.C.R., Aug. 1923, p. 59).

During 1923 trial shipments to Ontario were instituted at $7.00 per ton. The Marcus Collieries sent seven

cars east, the Humberstone three, the Black Diamond two, Fraser-McKay two, the Penn one and the Chinook one. In November 1923 production from the district for one month was a record 72,000 tons. This record was broken in November 1924 when output was nearly 75,000 tons, the highest output for one month the area ever achieved (W.C.C.R., Feb. 1925, p. 26). Production per employee had also reached the respectable level of three and one half tons per shift in the larger mines (those producing over 2,000 tons per year) (A.C.C., 1925, p. 75).

The Depression years both hurt and helped the Edmonton coal mines. Regular coal-using customers reduced their levels of consumption, farmers mined coal on their own property under license for their own use, and a substantial amount of illegal coal mining took place (Mines Branch Reports, 1930-44). Circumstances which made it easy to develop new mines also favoured this non-commercial activity which cut into the regular producers' market. At the same time, because coal was cheaper, numerous households reconverted their heating systems from natural gas to coal. As will be pointed out, this decline in the use of gas was only temporary.

A shortage of labour during the war years led to the development of a number of strip mines north of the city. The impact of these operations on the underground mines is discussed in Chapter VI.

The Decline of Mining:

During and after the war, mines began closing. Since the closing down of redundant mines had been a feature of the Edmonton field from its earliest beginnings, this does not seem unusual, but this time it was the old, established firms which were winding up the business, and no new ones were appearing to take their place. In 1944 Dawson Coal Limited closed Mine No. 155 which had operated since 1907, and Bush Mines Limited closed Mine No. 707 in Beverly. In 1950 the Ottewell Coal Company went out of business and closed down both its mines (No. 91 and No. 1393). Mine No. 91 was the oldest operating mine in Clover Bar, having been started in 1904. In 1951 Banner Coals Limited, the Beverly Coal Company and the Red Hot Coal Company Limited closed down. The Red Hot Coal Company had worked out its property but continued to operate when it took over Mine No. 1727 as the Whitemud Creek Coal Company. In 1952 the Great West Coal Company Limited abandoned Mine No. 99. In 1953 there were sixteen operating mines in the District and they were losing working days because of a shortage of orders (Mines Branch Report 1953, p. 16). By 1961 the number was reduced to five and by 1968 only three were still listed, with the Whitemud Creek Coal Co. described as producing a small volume in the wintertime. At the present time two mines operate at less than capacity. These mines are described in detail in Chapter VI.

As each mine was forced to shut down, its market

was divided among the mines remaining in operation, enabling each of them to exist a little longer. The worked-out and the less efficient mines were forced to close first, leaving the market to the most efficient of the underground mines and the low-overhead-cost strip mines.

CHAPTER IV

THE EDMONTON DISTRICT COAL MARKET

Coal mined in the Edmonton District could be sold in one of two distinct markets: the central Alberta market based on the city of Edmonton but including the sparsely settled northern area and extending southward until differences in wage scales and in costs of transportation rendered it unable to compete in price with coal from Lethbridge and Drumheller; the extra-provincial market which included, in order of their importance based on total sales made between 1916 and 1959,[1] Saskatchewan, Manitoba, British Columbia and Ontario. Sales to Quebec and the United States are recorded but these are too small and infrequent to be of much economic significance. Quebec was too far away and competition from the United States and Nova Scotia was too stiff even with special freight rates. The United States also protected its domestic markets with tariffs while dumping coal in Canadian markets, which Alberta producers considered should rightfully be theirs.

It must also be remembered that Edmonton coal was of the sub-bituminous class, considered suitable only for domes-

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[1] The Department of Mines of the Province of Alberta began publishing monthly statistics of sales in each province and to other countries, for each coal mining district in 1916. By 1960 sales outside the province had shrunk to the point where an annual summary provided sufficient information.

tic use, i.e. heating and cooking. The railway market was small as the coal was useful only for heating the stations. The coal also had to compete with bituminous coal for markets which involved raising steam in power plants. While the *Edmonton Bulletin* reported the number of cars of local coal being sent out of the district, it also mentioned numerous cars of coal being transported to Edmonton from Canmore for use in the railway locomotives, an anomaly which can be explained by keeping in mind the differences in coal types and quality.

In southern Alberta and outside the province, Edmonton coal competed directly with equivalent grades of coal mined in the Lethbridge and Drumheller fields. Edmonton coal dominated the Alberta market (A.C.C., 1925, p. 131), even though the other two major sub-bituminous fields were much larger producers by volume. The explanation appears to be in the realm of labour relations which will be discussed in a separate section.

The annual sales in the Alberta market have been plotted on figure18, the sales in each of the four components of the extra-provincial market on figure 13. Comparison of the over-all patterns shown on these two graphs indicate marked differences in the two markets. Factors which produced wide year-to-year fluctuations in all four components of the extra-provincial market apparently had very much less effect on the provincial or domestic market.

Tabulation of the statistics shows that at no time

did the extra-provincial market account for more that 25% of total sales (see Table II). This figure was achieved in 1916 when, on total sales of 487,864 tons, 75% was sold in Alberta and 25% was sold outside the province. For the years between 1913 and 1925 (except 1916) the proportion sold outside the province was an average of between 10% and 20% of total sales. After 1925 the amount sold extra-provincially was always less than 10% except in 1928 when it was 10% and 1950 when it was 11.9%. The external market dwindled steadily except for a period from 1946 to 1952 when sales in other parts of the country were temporarily increased. The nation-wide conversion to gas, oil or electricity is reflected in the statistics from 1950 onward which show a steady decrease in the amount of coal sold.

A very noticeable feature reflected in all the statistics, total output, sales in all markets, men employed and days worked, is the marked seasonal effect. The mines worked to full capacity during November, December and January. In February production was cut back so that stocks on hand could be used up. Activity was increased in September to prepare the mines for operation and build up stocks to meet expected demands. Thus the mines worked at less than maximum capacity for nine months of the year and were nearly idle during three of those months. This complemented the pattern of labour availability since most of the miners worked on farms during the summer. However it left the capital equipment of the mine seriously underutilized.

TABLE II

SALES OF EDMONTON DISTRICT COAL IN PROVINCIAL AND EXTRA-PROVINCIAL MARKETS

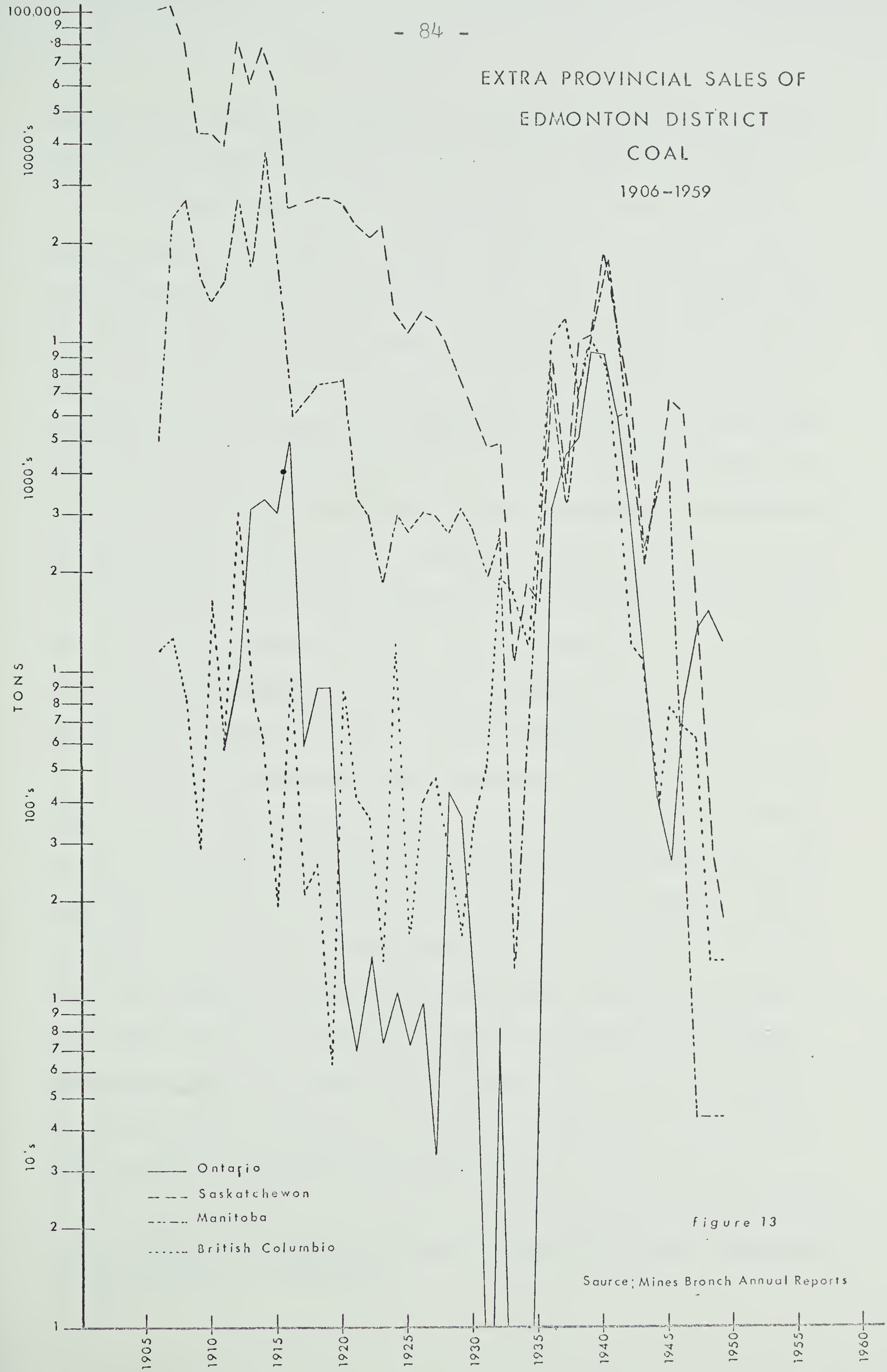
| YEAR | TOTAL SALES (in tons) | %ALBERTA | %OTHER | YEAR | TOTAL SALES (in tons) | %ALBERTA | %OTHER |
|---|---|---|---|---|---|---|---|
| 1913 | 523,308 | 82.3 | 17.3 | 1942 | 508,757 | 98.5 | 1.5 |
| 1914 | 412,728 | 82.2 | 17.2 | 1943 | 452,361 | 99.2 | 0.3 |
| 1915 | 318,546 | 82.3 | 17.9 | 1944 | 385,100 | 98.3 | 1.2 |
| 1916 | 487,864 | 74.3 | 25.2 | 1945 | 400,988 | 98.1 | 1.3 |
| 1917 | 599,108 | 76.4 | 23.2 | 1946 | 475,346 | 94.2 | 6.9 |
| 1918 | 602,663 | 81.3 | 18.3 | 1947 | 488,659 | 95.9 | 4.4 |
| 1919 | 534,167 | 88.1 | 11.4 | 1948 | 438,912 | 92.3 | 6.3 |
| 1920 | 582,546 | 89.5 | 10.6 | 1949 | 469,521 | 91.2 | 8.3 |
| 1921 | 553,697 | 89.3 | 10.2 | 1950 | 491,906 | 88.4 | 11.9 |
| 1922 | 625,031 | 81.4 | 18.3 | 1951 | 353,295 | 91.2 | 8.4 |
| 1923 | 588,663 | 85.4 | 14.2 | 1952 | 274,810 | 94.4 | 5.2 |
| 1924 | 646,537 | 80.4 | 19.2 | 1953 | 233,479 | 97.4 | 2.1 |
| 1925 | 539,159 | 85.7 | 14.5 | 1954 | 240,393 | 96.1 | 4.0 |
| 1926 | 443,453 | 91.1 | 88.3 | 1955 | 218,046 | 94.1 | 5.7 |
| 1927 | 496,808 | 93.6 | 6.4 | 1956 | 174,634 | 95.9 | 4.9 |
| 1928 | 449,630 | 89.3 | 10.2 | 1957 | 141,087 | 97.3 | 2.1 |
| 1929 | 465,724 | 92.8 | 7.4 | 1958 | 119,586 | 98.3 | 1.9 |
| 1930 | 408,813 | 91.1 | 8.3 | 1959 | 120,691 | 98.8 | 1.4 |
| 1931 | 360,613 | 92.9 | 7.3 | 1960 | 101,346 | 98.8 | 1.2 |
| 1932 | 441,110 | 94.1 | 5.3 | 1961 | 89,873 | 98.8 | 1.3 |
| 1933 | 465,504 | 94.3 | 5.1 | 1962 | 90,068 | 98.8 | 1.3 |
| 1934 | 442,306 | 96.9 | 3.4 | 1963 | 85,261 | 98.2 | 1.5 |
| 1935 | 480,857 | 97.5 | 2.4 | 1964 | 86,423 | 99.3 | 0.6 |
| 1936 | 532,645 | 97.1 | 2.5 | 1965 | 92,277 | 99.2 | 0.7 |
| 1937 | 530,462 | 97.5 | 2.3 | 1966 | 80,288 | 99.3 | 0.6 |
| 1938 | 509,228 | 97.2 | 2.4 | 1967 | 63,123 | 99.2 | 0.4 |
| 1939 | 464,695 | 97.2 | 2.2 | 1968 | 47,892 | 98.5 | 1.2 |
| 1940 | 476,401 | 98.2 | 1.5 | 1969 | 47,007 | 99.5 | 0.5 |
| 1941 | 474,639 | 98.2 | 1.3 | | | | |

Source: Alberta Dept. of Mines and Minerals, Mines Branch. <u>Annual Reports</u>, 1913-1969.

The Extra-Provincial Market:

Since there are no tariffs between provinces, the existence of a provincial boundary in theory does not impede the free flow of goods from one province to another. In actuality, policy as determined by the provincial government can have a substantial effect on inter-provincial trade. A provincial government can, if it wishes, promote the sale of some product in other parts of the country by directly or indirectly subsidizing the producer so that he can sell at competitive prices over greater distances. Provincial governments can also help by lobbying for concessions from the railways in the setting of freight rates, by giving support to or even initiating sales promotions and by establishing permanent information centers outside the province to promote the use of one or a number of products. All these tactics were employed by the Alberta government to sell coal in other parts of Canada, thus benefiting the Edmonton producers and those in the other districts.

The Saskatchewan market, because of proximity and the absence of physical and political barriers, was actually an extension of the northern and central Alberta market (see figure 13). With the completion of the Grand Trunk Pacific Railway from Winnipeg to Edmonton in 1909, local industry had more direct access to markets in central Saskatchewan, particularly centers such as Battleford and Saskatoon, than did its main competitors, and was at only a slight disadvantage in shipping distance to Regina. However, the Alberta Coal


EXTRA PROVINCIAL SALES OF
EDMONTON DISTRICT
COAL
1906-1959
TONS
10000's
1000's
100's
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100,000
Ontario
Saskatchewon
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British Columbio
figure 13
Saurce; Mines Bronch Annual Reports
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960

Commission noted that central and northern Saskatchewan were served by Drumheller steam coals (A.C.C., 1925, p. 133).

An important factor governing coal sales in both Saskatchewan and Alberta, was the success or failure of the grain harvest. If the crop was poor, or if the crop was good but the farmer lacked markets, he would be forced by lack of cash to make stringent economies in his purchasing. This might include closing off portions of the house and limiting heating to those rooms essential for living such as the kitchen. If the cash situation was really pressing, temperatures in the occupied portions of the house might be reduced to the lowest tolerable levels. These economies would significantly reduce the consumption of coal per household.[2] Thus a poor year from the viewpoint of farm income, would cut very significantly into the Alberta - Saskatchewan coal trade.

Saskatchewan does have extensive reserves of lignite coal in the southeastern corner of the province but, because of its low grade it was not competitive with better quality imported coal except in the area where it was mined. Saskatchewan always had a clear lead as the best market for Edmonton coal outside the province, although during the period 1945-1950, sales in Manitoba, British Columbia and Ontario reached comparable levels (see figure 13). At best, sales in Saskatchewan accounted for about twenty per cent of the total sales from the Edmonton District.

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[2] For a discussion of farm expenditures see Dawson and Younge, 1940, pp. 141-150.

The next best market from 1916 until 1942 was Manitoba, and particularly the city of Winnipeg. Alberta operators considered this market rightfully theirs but they encountered stiff competition from American anthracite shipped all the way from the eastern United States. From articles appearing in the Western Canada Coal Review (August 1929, p. 20), and from the report of the A.C.C. it appears that American producers were taking advantage of cheap transportation and lax Canadian anti-dumping regulations to place coal on the Winnipeg market at prices with which Alberta producers found it very difficult to compete.

Cheap transportation on the Great Lakes was provided by empty grain ships which carried coal as ballast. Western mine operators accused the American producers of selling coal at a loss to keep the market, and covering deficits by higher prices in the United States. Alberta operators did not help themselves by shipping coal to Winnipeg without a definite order in hopes of finding a buyer. This 'distress coal' compounded problems in a market which was already extremely competitive and highly unstable.

Freight rates were a sore point. The charge for coal from Drumheller to Winnipeg was \$4.70 a ton in 1925, more than it cost to produce the coal (A.C.C., 1925, p. 145). The freight on coal from the lakehead was \$3.30 a ton. Alberta dealers argued that with a decrease in freight charges of fifty cents a ton they could be competitive with the American anthracite and with a decrease of a dollar per ton they could

drive out the American coal and capture the entire market (A.C.C., 1925, p. 142). In addition the railways would benefit from the increased business. A summer rate of $4.00 a ton for domestic coal was also suggested, giving the railways off-season business and ensuring that a supply of Alberta coal would be on hand when customers started to order (A.C.C. 1925, p. 148).

In this instance the Alberta government supported the provincial coal producers by establishing a Provincial Coal Office in Winnipeg to promote the sale of and instruct in the correct use of Alberta coal. Pamphlets called "Coal Truths" were made available to advertise its qualities and methods of use.

Sales from the Edmonton field were only a small proportion of total Alberta sales in this market and they never accounted for more than one per cent of the total output from the district.

The British Columbia market was relatively nearby in terms of distance but the cost of hauling through the mountains was high and the bituminous mines were better placed. British Columbia also possessed an active coal mining industry of its own on Vancouver Island and on the mainland, with cheap ocean transportation readily available and close to the major consuming points, Vancouver and Victoria. Figure shows clearly that Edmonton producers never made any substantial inroads into this market and that in most years sales were insignificant.

The effort made by Alberta producers to establish themselves in the Ontario market is a rather complicated one. Its success or failure hinged on freight rates (W.C.C.R., April 1928, p. 9). The Ontario market was a rich one, being both populous and prosperous, and its coal was supplied almost entirely from American sources. No possibility existed of competing successfully with American bituminous coal. It did seem possible that American anthracite which was used for domestic purposes, and which had been deteriorating in quality and increasing in price for some years prior to 1925, could be displaced by Alberta sub-bituminous coal (A.C.C., 1925, p. 152).

Trial shipments were made in 1922 at a rate of $9.00 per ton and the response from Ontario consumers was deemed encouraging. Furthermore, the governments of both provinces as well as the federal government were anxious to encourage this all - Canadian trade. The coal was to be moved during the railways' slack season in the summer, before grain shipments began, or in the winter after they had ended. According to the comments in the W.C.C.R. and the A.C.C. Report, the railways do not seem to have been particularly interested in the business and there was some difficulty and delay in getting them to set a rate. In 1925-26, 75,000 tons were sent east at $7.00 per ton (A.C.C., 1925, p. 153). The producers hoped that the rate would be lowered while the railways felt it should go up. An inquiry by the Board of Railway Commissioners did not resolve the matter as the Commissioners did

not agree among themselves and produced a majority and a minority report which differed considerably in the rates quoted ($7.22 vs. $6.50, W.C.C.R., April 1928, p. 9). As an experiment and to determine the actual cost, it was decided to move the coal during the off season for a period of three years at $6.75 per ton. The Board of Railway Commissioners was to supervise the operation carefully and determine at the end of each season what costs over and above the $6.75 the railways had actually incurred. In this way it was hoped to establish the true cost of moving Alberta coal to Ontario.

Results during the first two years of the trial period were described as 'disappointing' (W.C.C.R, December 1929, p. 28) and this was attributed to the fact that the coal was shipped during the summer months when it had to be stockpiled, something that neither homeowners nor dealers seemed inclined to do. For the concluding year, the shipping period was to begin in December, subject to all grain shipments having been completed, and extend until July. An interim report by the Board of Railway Commissioners which suggested that the true freight rate ought to be about $8.23 a ton, was greeted with dismay and protest by coal producers and government officials. The test period was extended for another year so that a larger volume of traffic could be developed which would reduce the cost per ton.

It appears that at $6.75 per ton, Alberta coal was just barely competitive. If the national economy had remained buoyant and if the producers had had more time to advertise

their product and give demonstrations of its proper use, they might have captured a share of the Ontario market. Unfortunately, the nation (like most others), was entering the period known as the "great depression", and people in strained financial circumstances were burning the cheapest fuel available regardless of quality or preferences. Under those circumstances, Alberta coal was non-competitive.

Edmonton producers were certainly interested in the potential new market. In 1926 they managed to move five thousand tons to Ontario. Sales during the test period never reached one thousand tons annually and were about one hundred tons or three cars per year during the depression. A slight upturn during 1938-39 was wiped out during the war years due to a number of factors, particularly local coal shortages[3] and a shortage of rolling stock for non-strategic goods.

During the late 1940's, with the local market declining, Edmonton producers were able to put as much as nine thousand tons into the Ontario market for two successive years (1949 and 1950). supplies from American sources were disrupted by strikes in the American anthracite fields and devaluation of the Canadian dollar made American coal relatively more expensive. Because oil and natural gas were not locally available but had to be imported, Ontario did not move away from coal as a domestic fuel as rapidly as did the

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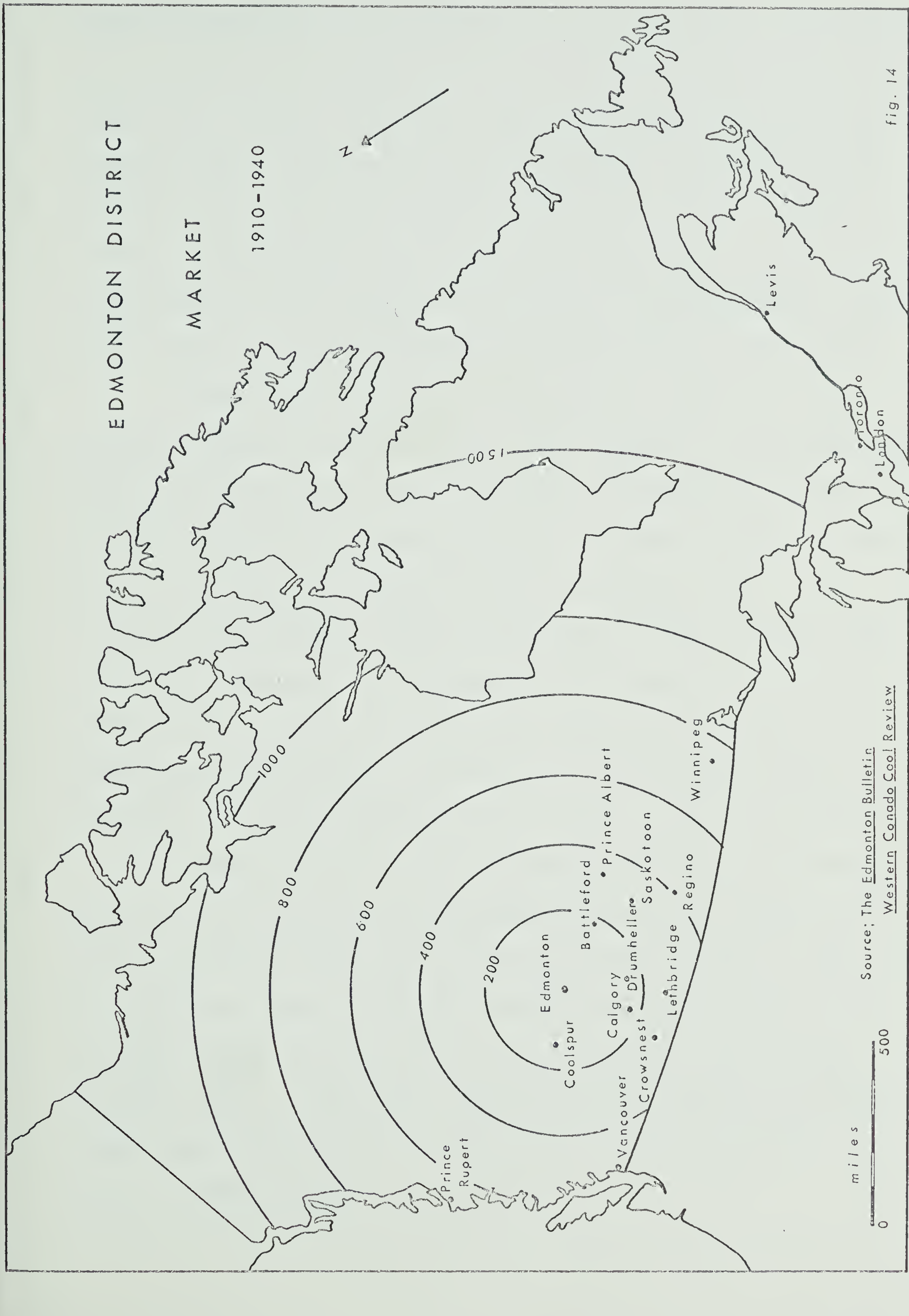
[3] From October 1942 to December 1943, an embargo was placed on all shipments of western coal to Ontario as a "temporary measure" to alleviate serious coal shortages in the west.


EDMONTON DISTRICT
MARKET
1910-1940
N
1500
1000
800
600
400
200
Edmonton
Coolspur
Calgary
Drumheller
Battleford
Prince Albert
Saskatoon
Regina
Lethbridge
Crowsnest
Vancouver
Prince Rupert
Winnipeg
Toronto
London
Levis
miles
0
500
Source; The Edmonton Bulletin
Western Canada Coal Review
fig. 14

western provinces. It presented some opportunity for western coal producers to maintain their volume of business for a few years even though the local market was contracting rapidly. Even now the Star-Key Mine still receives orders for a few cars of coal each year from a dealer near London, Ontario (Mr. W. Worthington, pers com., June 23, 1971). This is the last trace of the Edmonton District's extra-provincial market as no coal has been sold in any other province since 1964.

The longest shipments of which a record was found were in 1922 of a car of stove coal shipped by the Humberstone Mine to Leval, Quebec and a shipment by an unnamed company of a car of egg coal to Levis, Quebec. Freight charges on the latter were $13.30 a ton (W.C.C.R., October 1922, p. 62). In October 1924 Fraser - McKay Collieries shipped several cars of coal to points in North Dakota and Montana (W.C.C.R., Nov. 1924, p. 35). This was the first order for Edmonton coal from the United States. Operators hoped it marked the beginning of an international trade but this did not materialize.

Compilation of the statistics shows that the total amount of coal sold in Saskatchewan during the period of record (1,113,465 tons) was more than twice as much as that sold in the other three provinces combined (Manitoba 343,521 tons, British Columbia 83,103 tons, Ontario 68,271 tons: total 494,895 tons). The total extra-provincial sales (1,608,360 tons) were 9.3% of sales in Alberta (17,214,195 tons), and 8.5% of total sales.

The Provincial Market:

This market is defined as including all of Alberta because this is the smallest unit for which sales statistics are available. Most of the coal was consumed in Edmonton (375,000 tons in 1936 of a total output of 543,014 tons according to the W.C.C.R., July-August, 1936, p. 27). The tendency to consume most of the production within the District increased as the population increased, although this was partially offset by the introduction of natural gas. A "home market area" should be defined, probably including central Alberta and west-central Saskatchewan, but this is impossible when, as in this case, statistical reporting areas do not coincide with geographical or economic areas.

The completion of the Calgary and Edmonton Railway opened up markets as far south as Calgary and the construction of the Canadian Northern and Grand Trunk Pacific Railways opened up markets to the east. Edmonton producers began to take advantage of these almost at once. As other coal fields were developed, Edmonton producers encountered increasingly stiff competition, particularly in the south. They complained bitterly about the freight rates, since these, labour costs and productivity were the major variables which determined the selling price of coal in a particular market.

A large number of Edmonton District mines, mostly small operations called 'wagon mines' which survived for only a few years, were not located close to railways. They delivered most of their output in wagons hauled by teams of

horses to customers within a limited radius. Comments in the W.C.C.R. indicate that during the 1930's a well-equipped dealer should have both teams and trucks at his disposal, teams being easier to start in cold weather, less likely to get stuck in mud or snow and less likely to slip and skid on ice, thus insuring more reliable service. Wagon mines could deliver coal to dealers who in turn would distribute it to their customers. The mines could deliver directly to their customers or the customers could bring their own teams and wagons to the mine and load the coal themselves at a considerable saving in cost per ton.

The A.C.C. Report was critical of the small producers although it recognized that in some cases they were the only source of coal in an area. It regarded them as contributing to the overcapacity which existed in the industry and as a significant cause of unstable prices, as the wagon mines would attempt to undersell the established mines and dealers in an effort to obtain business (A.C.C., 1925, p. 333). The A.C.C. regarded the resulting price wars as bad for the industry, although the consumer may have had a different opinion.

Most of the larger and longer enduring mines were designated as 'shipping mines', although they also delivered locally by wagon or truck. The mine tipple would be situated close to a railway siding or spur so that boxcars could be loaded directly. These mines numbered about forty in all, although they did not all operate at the same time. They accounted for most of the sales made beyond the immediate


Figure 15: Clover Bar Coal Company (Mine No. 9) on the north side of the river with the piers of the Grand Trunk Pacific Railway bridge in the background. This mine was very close to the present Highway 16 bridge at Clover Bar.

Figure 16: Later photograph of the Clover Bar Coal Company Mine with a new shaft and headframe beside the completed Grand Trunk Pacific tracks. This 'wagon mine' became a shipping mine with the coming of the railway.

vicinity of Edmonton. Their products, under registered brand names, were advertised in newspapers and trade journals. They also sold substantial amounts of coal in Edmonton, at first by the same methods as the wagon mines. However the larger mines, with more investment capital available, were able to adopt technological innovations more rapidly than their smaller competitors, thereby reducing their operating costs and the price of their product. A description of the Penn Mine when it was being developed as a private enterprise venture, stressed the installation of all the latest equipment, including such things as compressed air coal cutters and electrically operated rotary screens (W.C.C.R., April, 1921, p. 29). This was subsequently one of the most successful mines in the District. The larger mines were also able to pay better wages, an important factor during the periodic labour shortages which occurred in the mining industry. These circumstances gradually forced the smaller mines out of business.

Beginning in 1898, a record of all of the coal mines which operated in the Edmonton District was kept by the Mines Branch, Department of Mines and Minerals (see Appendix A). These records show that there have been 192 mines registered in the district along with the year in which each mine was officially opened and officially abandoned. Of these mines forty-nine operated for two years or less and eighty-four operated for four years or less. Considering that some time must be spent in development work and that some further time must pass before production is sufficient to recover the

capital cost of development, these mines which operated for so short a time were not financially successful. The coal they produced added to the instability of an over-exploited market and they probably contributed to their own demise by forcing down the price of coal.

Forty-one mines operated for periods of between five and nine years. Some of these were closed for a time before being declared abandoned. It is questionable whether these could be called successful ventures, although some, like the Strathcona Coal Company (16,000 tons per year) did reach significant levels of production. Some were apparently successful mines which were put out of business by such unforseeable occurrences as fire or flood.

Sixty-seven mines operated for periods of ten years or longer and thirty-four of these operated for periods of twenty years or longer, including the two which are still active in 1971. These mines accounted for the bulk of the output in the Edmonton District. They had a sound enough financial base to withstand the seasonal aspect of the market and to survive the fluctuations introduced by economic and climatic conditions. To do this successfully they must also have enjoyed shrewd management. Some closed when all the coal in their lease had been mined. Others were forced to close by shrinking markets and rising labour costs.

The mine operators always maintained that their profit margin was very slight. For example;

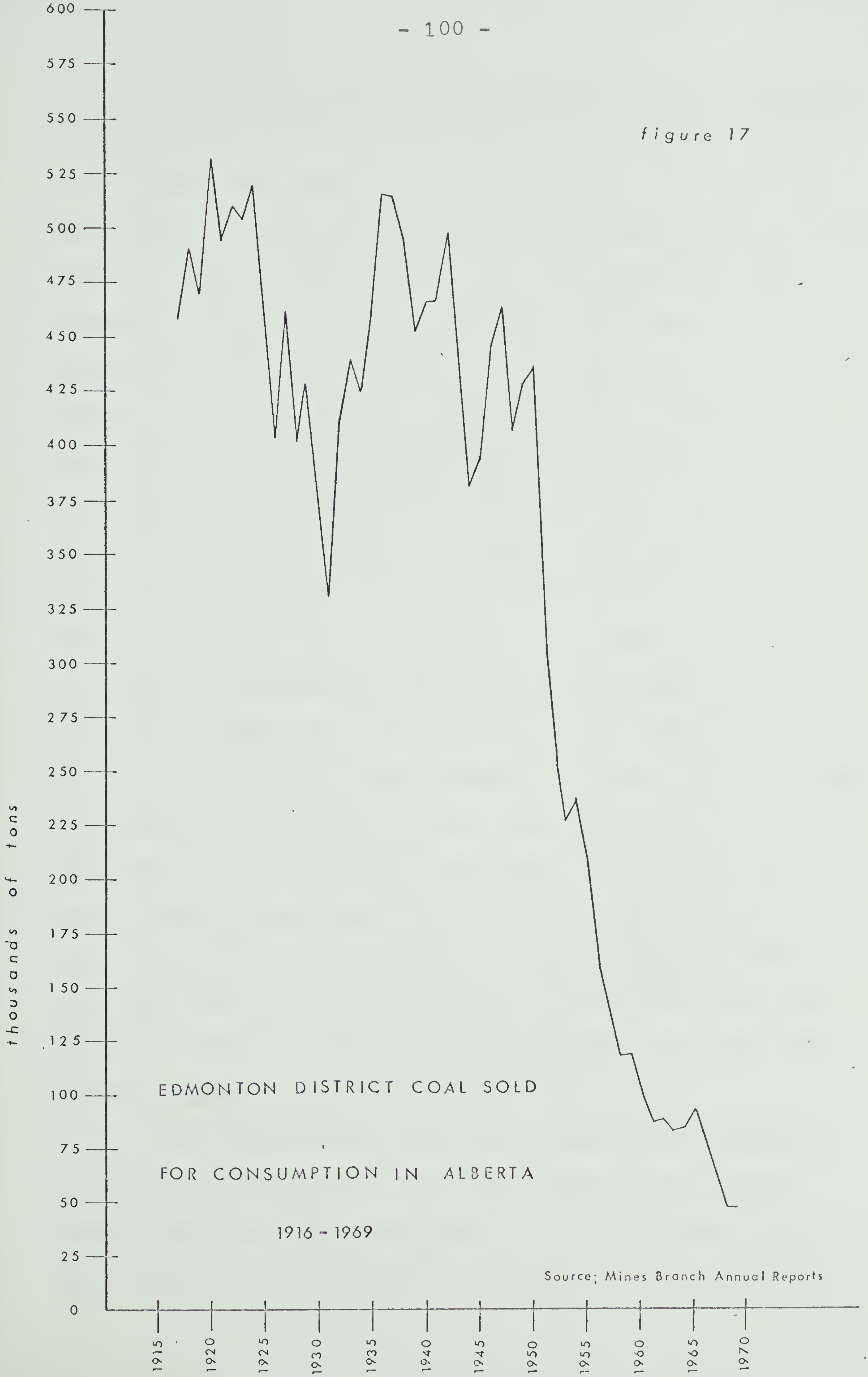
"During that year [1919-1920] which was one of

> the best years in the history of the company [Humberstone Coal Company Limited] owing to an unusually long and severe winter, the company made a net profit of 23.1 cents per ton on an output of 82,791 tons." (W.C.C.R., April 1921, p. 30)

The same mine in previous years had had to spend $53,000 to repair damage caused by a fire and a flood, and a further $8,000 to repair damage caused by a fresh outbreak of the fire (W.C.C.R., April 1921, p. 30). The successful coal mines provided a livelihood for their owners and operators but it does not appear that fortunes were made in the business.

The figure titled "Edmonton District Coal Sold for Consumption in Alberta" shows that coal sales climbed to a peak of 533,000 tons in 1920 and, after remaining near that figure for four years, dropped in a series of sharp declines to a low of 332,000 tons in 1931. The remarkably low level of 1931 can be accounted for by the combined effect of an unusually mild winter in 1930-31 and the depressed state of the economy. By 1936, aided by colder winters and improving economic conditions, sales climbed back to levels approaching those of the early 1920's, but not above them. Yet between 1926 and 1936 the population of the city had increased by twenty thousand and the population of Alberta by over fifty thousand, thereby providing a considerably expanded potential market. From 1937 onward, although the population of the city and the province continued to grow, the consumption of coal for domestic use declined as it was replaced by cheaper, cleaner and more convenient natural gas.

figure 17



600
575
550
525
500
475
450
425
400
375
350
325
300
275
250
225
200
175
150
125
100
75
50
25
0
thousands of tons
EDMONTON DISTRICT COAL SOLD
FOR CONSUMPTION IN ALBERTA
1916 - 1969
Source; Mines Branch Annual Reports
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970

An advertisement in the Morning Bulletin by Northwestern Utilities Limited on November 6, 1923 informed readers that natural gas from the Viking field was available in the gas mains of south Edmonton and in north Edmonton west of 99th Street. Prior to that time it is a safe assumption that virtually every household in Edmonton used coal or wood for domestic purposes. In November 1924 there were 5,732 gas consumers in Edmonton (A.C.C., 1925, p. 172). By 1926 local coal mine operators were feeling the competition. The W.C.C.R. estimated that there were 15,000 homes in the city, of which 8,000 were using gas (W.C.C.R., August 1927, p. 34). The homes still using coal were the smaller ones and those scattered on the outskirts of the city. One local operator made a "conservative estimate" that this represented a loss in sales of approximately 150,000 tons to the industry. By 1936 the W.C.C.R. reported that a number of homes which had installed gas were reverting to coal. This was attributed to the high cost of gas and to the development of furnaces with automatic stokers which combined convenience with cheapness (W.C.C.R., July-August 1936, p. 28). The 1941 Dominion Census for the first time presented statistics on fuels used for home heating. These statistics were continued in the 1951 and 1961 census' and are presented in Table III.

The summer coal trade was eliminated as housewives switched from coal burning kitchen stoves to the faster, cleaner and above all, more easily controlled, gas ranges. Even economy could probably not have saved this market for

TABLE III

FUELS EMPLOYED FOR DOMESTIC HEATING - EDMONTON

| | 1941 | % | 1951 | % | 1961 | % |
|---|---|---|---|---|---|---|
| Total Households | 23,082 | 100.0 | 42,925 | 100.0 | 76,269 | 100.0 |
| Coal or Coke | 12,349 | 53.4 | 2,410 | 5.6 | 305 | 0.4 |
| Wood | 208 | 0.9 | 135 | 0.3 | --- | --- |
| Liquid Fuel | 46 | 0.2 | 255 | 0.6 | 1,725 | 2.3 |
| Gas | 10,456 | 45.2 | 40,080 | 93.4 | 74,149 | 97.1 |
| Other | 23 | 0.1 | --- | --- | --- | --- |

Source: Canada. Dominion Bureau of Statistics. Census of Canada;
1941, volume 9, Table 11a, p. 58.
1951, volume 3, Table 26, p. 26-6.
1961, volume 2, part 2, bulletin 2.2-4, Table 52, p. 52-2.

the coal industry. Although economy was a more important consideration in winter heating, and exact temperature control less important, coal producers, while they did not expand their market, maintained it at a nearly constant level until the 1940's through technological innovation and minimum prices. During the war years, recurring coal shortages were caused by a shortage of miners while the events of the winter of 1942-43 with low temperatures and severe snow storms aggravated shortages to the point where public buildings were closed because there was no coal in the bins to heat them. The shortages could not be alleviated because delivery vehicles could not get through the snow drifts. This may have helped persuade householders and commercial property owners who had not already done so, to turn to a fuel supply which was less subject to disruption. By 1951, 95% of the households were using gas and by 1961 the switch was virtually total (see Table III).

A major part of the coal trade was sold to institutions. The city power plant, the public and separate schools, the University of Alberta, the Provincial Legislative Building and the Macdonald Hotel all purchased coal. These examples were chosen because they were all large consumers and some consumption data is available.

In 1924 and again in 1926, the gas company (Northwestern Utilities Limited), offered to supply gas for the city power plant on very favourable terms (W.C.C.R., April 1926, p. 8). Both times the offer was rejected, partly at least

because of strenuous opposition by the local mine operators. The acceptance of tenders for the supply of coal to public institutions was complicated by the fact that the city council agreed to take into consideration the number of city residents employed in local mines and the contribution of the mines to the city economy when placing orders. Thus, in 1925 an order for 30,000 tons of coal for the powerhouse, worth approximately $80,000 was split, 20,000 tons being purchased from the lowest bidder, a mine outside the district, and the order for the remaining 10,000 tons being distributed among the local mines (W.C.C.R., April 1925, p. 4, p. 15). The same considerations applied when accepting tenders to supply coal to the public and separate schools which all together required about 10,000 tons a year.

The Penn Mine Coal Company, operating the Penn and the Chinook Mines, had the contract to supply coal to the University of Alberta which used about thirty tons of coal a day in its central heating plant and the Macdonald Hotel which used about twenty-five tons per day (W.C.C.R., August 1929, p. 20). Two other examples include the Provincial Legislative Building which used about thirty tons a day and the Tegler building which used about twelve tons. When any of these examples switched to gas heating it meant a substantial loss of business to the company which had the coal contract.

In 1936 the city power plant required about 95,000 tons of slack and 'mine run' (unscreened) coal annually. The Finance Committee recommended that the city should buy from

any local operator who would meet the city's price rather than from an individual operator on a contract basis. In 1950 the city decided to buy coal for the power plant from strip mines at $2.15 per ton. The six local collieries which had been supplying coal at $2.50 per ton protested. They agreed to lower their price to $2.35 per ton but suggested that they could go no lower and might have to suspend operations entirely if they lost the contract (Edmonton Journal, Sept. 7, 1950).

Between 1946 and 1951 the power plant doubled its capacity, then doubled it again by 1956. The new units were gas burning and the old coal burning units were gradually replaced, so that by 1954 gas was used entirely (MacGregor, 1967, pp. 289-290).

The interest which the city government took in the coal mining industry during its heyday and the influence which the mine operators had with the city council is indicative of the importance of the coal mining industry to the city. For example:

> "The coal mines of the Edmonton, Alta., district are producing 12,000 tons a day, and employing 3,600 men the Edmonton Bulletin states. At an average daily wage of $5.00 that means a pay roll of $18,000 a day or over $100,000 a week. Allowing an average value of $3.50 per ton on cars at the pit, the daily output is worth over $40,000 or approximately a quarter of a million a week. In estimating the gross value of the coal industry to the district the railway freight to destination must be added, say an average of $1.50 a ton. On an output of 12,000 tons a day at that rate, the freight charge would be $18,000 or another $100,000 a week, making the coal industry of the Edmonton field worth a million dollars every three weeks to the general business of the district. The mines

> included in the foregoing calculation are those situated on or adjacent to, the main line of the C.N.R. both east and west of as well as within the city of Edmonton. The figures are estimates and do not assume absolute accuracy." (W.C.C.R., February 1923, p. 24).

There are substantial inaccuracies in this statement. The Mines Branch Report for 1923 indicates that 1076 men were employed in the Edmonton District in January and 1045 in February, and that the average production per working day was about 4,000 tons. The Bulletin reporter seems to have regarded the value of the industry as three times greater than it actually was and he did not take into account the seasonal effect. His account was reproduced elsewhere without being checked for accuracy. This would create a false impression of the importance of the industry in the minds of the readers and incline them to sympathize with the demands of the operators for more local support. As a matter of fact, an industry which employed over a thousand men during the winter in a city with a population of about 60,000 was an important industry.

At this point a comment on the reliability and accuracy of the data officially collected would be pertinent. Early official records such as those of the Mines Branch sometimes suffer from vagueness, inaccurate calculations and/or printing errors. In a few cases sources have been absolutely contradictory. Trade publications such as the Western Canada Coal Review suffer from reporting inaccuracies such as the preceeding example and they are also biased toward the

coal mining industry. Original doccuments have for the most part been lost or destroyed and there are few people still living who remember the early days of the industry.

Mine Labour and Mine Utilization:

Underground coal mining has been in the past and is still heavily labour intensive, even with technological innovations such as mechanical coal cutters and loaders. It has been shortage of labour, particularly during World War II coupled with high labour costs, which has led to the development of capital-intensive strip mining.

The 'gopher holes' in the riverbanks provided working space for only a few men (see figure 8 ). When business boomed, the work force was doubled by adding a second shift. Mining engineers were scarce but many of the European immigrants coming to Edmonton were experienced practical miners.

In 1897 the territorial government instituted a set of mining regulations based on those in force in Britain and appointed an Inspector of Mines to see that the regulations were complied with. The reports of the early inspectors make it quite clear that, while some of the mines were internally well constructed, others lacked even elementary provision for timbering and ventilation. There was considerable resistance to implementing the regulations, compliance with which increased costs of production, particularly among those with little experience in mining. This work and the keeping of records pertaining to each mine, was carried on by the provincial government when it was established in 1905.

The replacement of 'gopher holes' by mines worked on the room and pillar plan took place shortly after good railway connections with other parts of the country had been established. After 1910 a number of mines east of the city which had been entered by drifts from the riverbank or ravines were reported as sinking shafts near where the railways crossed their property. This made it possible for them to load coal into boxcars directly from the mine instead of having to haul it up the riverbank. By 1925 the room and pillar layout was standard in the important mines of the Edmonton District (A.C.C., 1925, p. 65) and mechanical cutters and loaders were coming into use. At the same time the Mines Branch was requiring miners to demonstrate a sound knowledge of practical mining before they could be employed in the responsible positions of Fireboss, Overman or Mine Manager. A problem developed at this point as the examinations were written and some of the miners with years of experience underground could not pass the examinations because they were illiterate or unable to write in English. Mining in the Edmonton District had progressed from a casual form of employment in which anyone could work, to a skilled trade which had to be learned by study and practice and in which proficiency was recognized by certification.

One of the most important considerations governing the selling price of coal was the cost of the labour which mined it. Unionization of the coal miners in Alberta by the

United Mine Workers of America[4] should have insured that the labour costs were uniform throughout the province. The history of the coal mine unions in Alberta is a complicated one and would make a sufficient subject for a thesis in itself.[5]

By 1919 when the first reference to union activity was found (W.C.C.R., January 1919, p. 41), some of the largest producers were partly unionized while all of the smaller ones were not unionized at all. Even in the union mines, it is not clear that a 'closed shop' existed and subsequent events indicate that the loyalty of union members to their organization was not deep.

A strike in 1921 led to the appointment of a conciliation board which heard evidence from the mine operators and the union workmen. The mine operators insisted that they were just breaking even or in some cases losing money. An increase in wages could only be met by increasing the price of coal and they were convinced that such an increase would cost them their export market and that even their local market would be taken over by Drumheller coal. Witnesses for the union insisted that the miners could not earn enough to maintain themselves and their families all year (W.C.C.R., February 1921, pp. 27,28, 30, 31). No mention is made of the fact that most miners had farm employment for the summer or that they looked on mining as a convenient part-time job. The

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[4] Hereinafter referred to as the U.M.W.A.

[5] In his thesis, A Social History of the Coal Branch, den Otter devotes a chapter to the union movement in that area.

majority report of the conciliation board, i.e. by the chairman and the employees' representative, recommended some wage increases and standardization of wages in all mines in the Edmonton field. A minority report by the representative of the mine owners recommended that all requests for increases be refused, stating the position of the mine operators in some detail.

Prior to the major labour upheavals of 1924 which took place in the coal fields throughout the province, the following situation was reported to exist;

> "Edmonton lump coal is being sold f.o.b. the mines at from $2.15 to $2.40 a ton. At these mines the wage rate for common labour is 40 cents to 45 cents an hour whereas the officials of the U.M.W.A. demand a rate of 82.5 cents for this work... At Drumheller when the price f.o.b. was $5.00 a ton some of the mines were actually losing money on their operations." (W.C.C.R., July 1922, p. 30)

The union was well aware of the situation and in the winter of 1922-23 had made an attempt to organize the field. A strike was called even though most of the men were willing to work (Allan, January 12, 1923, p. 41). Pickets were set up, reportedly using men brought in from outside the district (W.C.C.R., December 1922, pp. 14,15, 28) to stop the men from entering the mines, and the police were called out by civic officials to insure that men who wished to work could do so. Confrontations between the two groups led to property damage and personal injury.

The tactics of the U.M.W.A. seem to have antagonized nearly everybody and the strike fizzled out. The miners de-

cided to form their own union, The Edmonton and District Miners Federation, affiliated with the Canadian Federation of Labour. A number of the mine operators, i.e. Clover Bar Mines, Bush Mine Coal Company, Humberstone Mines Ltd., Marcus Coal Mines Ltd., Penn Mine Coal Co. Ltd., and Edmonton Collieries Ltd., formed the Northern Alberta Coal Operators Association, mainly for the purpose of negotiating wage agreements (A.C.C., 1925, p. 188).

Labour trouble developed again in the fall of 1925 when the operators tried and eventually succeeded in reducing wages. Another strike in the fall of 1926 "evaporated" with each mine making an individual agreement with its employees. The U.M.W.A. considered making another attempt to organize the region but concluded that it was first necessary to reorganize the Coalspur and Crows Nest districts in order to restore its prestige (W.C.C.R., November 1926, p. 7). The union did not have much prestige anywhere until the mid 1930's. By 1934 it had come back into the Edmonton District and represented the miners in obtaining a wage settlement lower than that which it had obtained for the miners in Drumheller, thus assuring a favourable price for Edmonton coal throughout northern Alberta and parts of Saskatchewan, to the intense annoyance of the Drumheller mine operators (W.C.C.R., August 1935, p. 17). Evidently the miners and their union accepted the operators' position that they could not compete with Drumheller if wages were equal. The miners preferred to work for lower wages rather than have union wage scales but less

or no work.

The U.M.W.A. continued to represent the miners in wage agreements with the larger collieries between 1933 and 1948 (Miss S. Jameson, Glenbow-Alberta Institute, pers. com., June 25, 1971). The wage differential was recognized by the union until the miners' wages throughout the province were equalized by government regulation during the war. This equalization prompted some of the operators to shut down their mines, temporarily or permanently.

In 1948 a wage dispute resulted in a strike at all the major mines which lasted from January 14 to July 16. This was the last major labour dispute in the Edmonton District. In 1950 the industry started on its spectacularly steep slide into near oblivion.

The point has been made a number of times that employment in the mines was seasonal, with extreme fluctuations between high levels in winter and very low levels in summer. A second variable in the employment picture was the number of days each month when coal was actually mined. During a cold snap the men often worked six days a week; in the summer the mine would only work three or four days a week, and the men were paid only for the days they worked. Small mines closed down entirely for the summer. Table shows the number of men employed each month, and the average number employed each year, at five year intervals beginning in 1916.[6]

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[6] Note that, while the <u>number</u> of men employed changes, the <u>pattern</u> of winter work and summer lay-offs remains true.

TABLE IV

NUMBER OF MEN EMPLOYED IN THE COAL MINES IN THE EDMONTON DISTRICT EACH MONTH 1916 - 1956

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1916 | 1100 | 1041 | 620 | 457 | 359 | 306 | 312 | 444 | 640 | 752 | 948 | 1089 |
| 1921 | 1571 | 1515 | 956 | 766 | 633 | 576 | 614 | 757 | 878 | 1079 | 1260 | 1403 |
| 1926 | 1002 | 862 | 751 | 441 | 315 | 319 | 308 | 427 | 661 | 854 | 934 | 1031 |
| 1931 | 825 | 577 | 530 | 393 | 328 | 332 | 322 | 367 | 610 | 715 | 881 | 903 |
| 1936 | 1098 | 1031 | 800 | 583 | 489 | 474 | 498 | 553 | 800 | 902 | 1112 | 1151 |
| 1941 | 932 | 815 | 705 | 429 | 326 | 303 | 283 | 360 | 622 | 771 | 875 | 887 |
| 1946 | 662 | 653 | 587 | 447 | 406 | 430 | 473 | 497 | 542 | 654 | 731 | 815 |
| 1951 | 670 | 577 | 385 | 152 | 147 | 164 | 159 | 195 | 304 | 420 | 507 | 467 |
| 1956 | 209 | 165 | 173 | 80 | 73 | 61 | 58 | 72 | 109 | 153 | 191 | 183 |

Source: Alberta Dept. of Mines and Minerals, Mines Branch. Annual Reports, 1916-1956.

The table shows that the peak employment months were November, December, January and February. The lowest levels of employment occurred during May, June and July, summer lows being about one third of the levels of winter peaks for the years shown. Substantial numbers of the early miners were homesteaders, so that being laid off in March or April fitted in well with preparing their land for crops. In the fall, if the harvest was late, there was sometimes a shortage of mine labour as the men working on the harvest would not be available to work in the mines until after the crop was in. This pattern of summer farming and winter mining is still followed by most of the workmen at the Star-Key Mine.

For the bituminous mines in the Coal Branch and Crows Nest areas, the peak work period was during the summer as the railways stockpiled coal along their routes in preparation for moving grain in the fall. It was suggested that the labour demand periods in the domestic coal districts and the steam coal districts complemented one another and that mine labour could best be employed by shifting miners back and forth between the districts (A.C.C., 1925, p. 10). There is no record to show that miners from the Edmonton District went to the mines in the Coal Branch in the summer, but it is quite possible that some did.

Table V shows the average number of days per month when coal was mined. In this table the highest levels of activity were generally achieved in October, November, December and January. During April, May, June, July and August the

TABLE V

AVERAGE NUMBER OF DAYS PER MONTH WHEN COAL WAS MINED 1913 - 1957

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 21.0 | 18.3 | 18.5 | 14.2 | 15.4 | 13.7 | 12.5 | 12.9 | 17.9 | 16.7 | 21.8 | 21.0 |
| 1917 | 24.7 | 21.2 | 18.7 | 20.0 | 19.7 | 20.0 | 18.7 | 22.0 | 21.0 | 24.0 | 22.5 | 22.0 |
| 1922 | 17.1 | 18.0 | 16.9 | 13.6 | 11.3 | 10.2 | 12.0 | 18.3 | 18.6 | 19.5 | 16.5 | 19.9 |
| 1927 | 19.6 | 17.3 | 16.0 | 15.6 | 16.5 | 14.2 | 13.2 | 13.7 | 18.9 | 17.7 | 23.0 | 22.4 |
| 1932 | 21.6 | 21.4 | 18.2 | 12.1 | 11.7 | 13.1 | 10.9 | 13.2 | 15.8 | 20.6 | 24.6 | 19.1 |
| 1937 | 22.1 | 18.8 | 15.4 | 14.5 | 13.3 | 12.4 | 11.2 | 15.9 | 15.6 | 19.5 | 22.6 | 21.2 |
| 1942 | 21.6 | 19.6 | 28.0 | 26.2 | 14.5 | 16.8 | 16.0 | 19.1 | 22.3 | 24.0 | 22.4 | 23.1 |
| 1947 | 21.6 | 19.8 | 15.4 | 13.5 | 15.0 | 15.6 | 16.1 | 17.9 | 16.3 | 19.5 | 19.3 | 18.3 |
| 1952 | 22.2 | 15.7 | 17.6 | 8.5 | 13.5 | 14.3 | 13.5 | 15.4 | 18.9 | 19.2 | 20.7 | 17.1 |
| 1957 | 21.6 | 19.3 | 14.5 | 10.2 | 16.0 | 18.8 | 14.5 | 16.3 | 18.2 | 21.8 | 21.3 | 21.4 |

Source: Alberta Dept. of Mines and Minerals, Mines Branch. Annual Reports, 1913-1957.

mines were clearly working much below capacity, to supply coal for the summer trade, or to stockpile coal for sale in the fall. Some mines were closed down altogether except for maintenance work but it should be noted that the table shows only days on which coal was actually mined. It has already been pointed out that gas eliminated the summer market for coal in the city almost at once after its introduction in 1923. It has also been mentioned that Edmonton coal does not maintain its properties very well when stockpiled, being very liable to deterioration through oxidation and loss of moisture content. Hence it was not really practical to mine much coal in the off-season and the tremendous capital investment represented by the mine and its equipment was grossly underutilized for half the year.[7]

Even during the peak season, a warm spell or a glut of coal on the market caused by too many mines competing in a limited area, could cause the mines to reduce the number of shifts being worked and lay off some workmen. This problem of overdevelopment (too many mines) was common to all the coal fields of Alberta. The only way to prevent this condition would have been to refuse to permit new mine openings unless the market warranted it and this was never done, probably because it would have been in violation of the free enterprise

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[7] Coal mined in the summer can be protected against oxidation by covering the screened coal with up to eight inches of slack. Coal containing fines or piles of slack more than two feet thick are liable to spontaneous combustion. These points must be kept in mind when storing coal, particularly in summer.

system.

It is immediately evident that, with the exception of experienced miners in responsible positions underground, and the management, a workman in the Edmonton District coal field could not be sure of regular employment or a predictable income when he was employed. This made mining one of the less attractive occupations in the area and during periods of general labour shortages, the mines were always shorthanded. Occasionally this meant loss of markets and hardship for the consumer when the mines could not produce enough coal to meet the demand, as for example, during the severe winter of 1942-43.

Conclusion:

From the foregoing analysis it is evident that the marketing of Edmonton coal upon which the prosperity of the industry ultimately depended, was influenced by a multitude of interrelated factors. It is equally evident that the market was a narrow one, and when coal was displaced by natural gas as a domestic fuel, the operators had no alternative but to close their mines, which they have done over the past two decades.

CHAPTER V

# THE COAL MINING INDUSTRY AND THE CITY OF EDMONTON

The presence of easily accessible coal was a positive factor in the growth of Edmonton. It has been pointed out in Chapter II how the descriptions of the area by promoters, which were designed to induce settlement, made mention of the convenient fuel supply. In Chapter IV some attempt has been made to evaluate the economic importance of the mines to the city in terms of numbers of men employed, value of wages and value of sales. In this chapter, the effect of the mines on the physical growth of the city will be examined.

Mining Areas in and Around Edmonton:[1]

The urban area, which is now the city of Edmonton, and the larger metropolitan district includes what were originally a number of separate communities. Edmonton was the settlement on the north side of the river, with the Hudson's Bay Company Fort as its focus, which spread eastward along the north side of the river. On the south bank, directly opposite

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[1] It is not the purpose of this chapter to describe exactly where every mine was located or exactly how extensive an area each undermined. This has already been done by Dr. R.S. Taylor, (Atlas: Coal-Mine Workings of the Edmonton Area) who has mapped the location of the recorded and some of the unrecorded mines on a scale of one inch to five hundred feet and estimated the extent of the mined-out areas.

Edmonton, the community which developed around the Calgary and Edmonton Railway terminal became the city of Strathcona. Until amalgamation in 1912, there was a strong rivalry between these two settlements for regional dominance. The development of the 'gopher-hole' mines on both sides of the river in the upper seam (Beach's number seven seam) has been described in Chapters I and II. By 1910 all of the drifts under these two cities between the High Level Bridge and 92nd St. had been abandoned (see Appendix A).

After thirty years of mining, a substantial amount of coal had been removed from under the riverbank. In September, 1899, the Town Council of Edmonton became concerned enough about subsidence and/or slumping of the riverbank to purchase the coal rights along the riverfront and so put a stop to 'gopher-holeing' on River Lots 4 to 14 (Taylor, 1971, p. 1).

With the exception of the Strathcona Coal Company Mine which was working the upper seam from a vertical shaft near the south entrance to the High Level Bridge, the coal mining industry had shifted eastward. Most of the new mines were working in the Clover Bar Coal Horizon which provided better coal and easier mining conditions. This coal formation was most accessible in the areas known as Ottewell and Clover Bar. By 1900, mines had been opened where it outcropped in the riverbank. When the Grand Trunk Pacific Railway was built through the area in 1908-09, a number of the mines were reorganized to ship coal by rail throughout

the prairie region (W.L. Worthington Sr., 1969, p. 6). Several of these mines became large volume, long term producers.

East of the city of Edmonton, the hamlet of Beverly was established as the residential area for miners working in a number of nearby mines. These mines were also working in the Clover Bar coal horizon for the most part, although it was here more deeply covered by overburden than farther east.

A few mines had already opened north of the city towards Morinville. The same had occurred south west of Strathcona along Whitemud Creek in the area known as Rabbit Hill. It was into these two areas that the mining industry finally moved after working out the best coal deposits in the areas already mentioned. These areas are still outside the corporate limits of Edmonton, a point which will be considered later in this chapter.

The Expansion of Edmonton Relative to the Mines:

In his memoir on the Edmonton coal field, Dowling (1914) confined his attention to the areas east of 109th St. on the north and south banks of the river (see Appendix B). On the south side his map shows the Strathcona Coal Co. (Mine No. 47, 1905-1911) on River Lot 9, the Twin City Coal Co. (Mine No. 177, 1908-1921) on River Lot 19 with the shaft between Mill Creek and the railway tracks, the Dawson Coal Co. (Mine No. 155, 1907-1944) on River Lot 25 with the shaft at the foot of the embankment, and the Frank Coal Co.(Mine No.

1357 when operated by the Red Hot Coal Co., 1931-1951) on River Lot 31 with the shaft just west of the Capilano Expressway[2]. This mine, closed after being flooded, was reopened and worked until the coal in the lease was exhausted. Between them, this mine and the Dawson mine undermined most of the area along Rowland Road. The workings were 250 feet below the top of the embankment and no effects at the surface have been reported.

Except for the first two mines mentioned, these were outside and west of the limits of the city of Strathcona. They were included within the area of the city of Edmonton when the city boundaries were extended east to 75th St. in 1913.

On the north side of the river, Dowling showed the Ritchie Coal Co. on River Lot 20 with its shaft on Frasers Flats (later called Riverdale), the Parkdale Coal Co. on River Lot 22 north of Rat Creek and east of the railway tracks, the Standard Coal Co. on River Lot 26 on the flats east of the mouth of Rat Creek. the Rosedale Coal Co. (Mine No. 128, 1907-1909) on River Lots 28 and 30 below the embankment, Bremner-Milner Coal Co. (Mine No. 74, 1903-1913) on River Lot 42, the Ketchum Coal Co. (Mine No. 125, 1906-1910) north on section 7, township 53, range 23, and the Clover Bar Coal Co. (Mine No. 9, 1897-1923) on section 18, township 53, range

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[2] The main entry of this mine is still identifiable in the embankment below the east end of Rowland Road.

23. For the companies Rosedale, Bremner-Milner and Ketchum, no shaft locations are shown. The available information indicates that the only mines Dowling considered were important producers at that time. He did not concern himself with 'gopher holes'.

None of the mines were within the area of Edmonton as it was first incorporated in 1892. The area including the property of the Parkdale Coal Company, was annexed in 1904 and that including the property of the Standard Coal Co. in 1910. The area including the property of the Rosedale Coal Co. was annexed at amalgamation in 1912. The Standard Mine and the Twin City Mine closed down within a few years of being included in the city, but this was specifically because they had exhausted the coal in the area of their leases (W. C.C.R., Dec. 1926, p. 40). The area including the Bremner-Milner Mine, the Ketchum Mine and the Clover Bar Coal Co. Mine was annexed in 1961, long after these mines had ceased operating.

In 1913 River Lots 36, 38 and 40 and part of section 13, township 53, range 23 were incorporated as the town of Beverly. Mine No. 1366 undermined a substantial part of the town between 1931 and 1951. The town depended heavily on mining, so much so that in 1936 the town was engaged in a law suit against the Beverly Coal Co., a co-operative venture established to provide work for unemployed miners, which had closed down, apparently owing the town money which it was unable to pay. Beverly was not annexed by Edmonton until 1961.

During one discussion of annexation, a topic which arose each time Beverly was in financial difficulty, which was frequently the case, the point was made that no coal mining could be carried on within Edmonton city limits (Edmonton Journal, March 30, 1945). There is no reason to believe however, that this regulation was a major impediment to annexation. Dale (1969, p. 358) remarks that "...Beverly was not suited to residential development... The land was pitted with subsidence from old coal workings, and was suited more to the development of parkland."

Coal mines which operated on the south side of the river east of River Lot 43 are still outside the city limits. It is on this land which was undermined by Mine No. 99 (1903-1952) the Black Diamond Mine operated by the Great West Coal Co., Mine No. 1393 (1932-1950) operated by the Ottewell Coal Co. and Mine No. 1427 (1933-1945) operated by the Kent Coal Co., that much of Edmonton's chemical and petroleum refining industries are located. Indeed, according to Dale (1969, p. 358), the susceptibility of this area to subsidence was "a hindrance to residential development, as indeed to utility installations." There is no indication that it has created any problems for the industries located there. They were aware of the undermining before construction of their facilities began (The Catalyst, Canadian Chemical Co. Ltd., May, 1959). It is quite likely that this area will be annexed sometime in the future. Plans for annexation have so far not materialized due to the opposition of the County of

Strathcona which would lose the property tax from the industrial development, an important source of revenue.

The area including the lower reaches of Whitemud Creek was annexed at amalgamation in 1912 and a further area was added in 1964. Mine No. 1727 operated by the Whitemud Creek Coal Co. (formerly the Red Hot Coal Co.) which operated from 1952 to 1970, undermined an area which was included in the 1964 annexation. Subsidence problems involving recently constructed homes have occurred in the area around 142nd St. and 48th Ave. (Mr. P. Naughton, pers com., June 24, 1971). The great majority of the mines in the Rabbit Hill district were farther south in an area not yet annexed by the city (see Appendix C). It is very probable that this area too will be annexed as Edmonton grows. Subdivision and the construction of residential housing which is the most probable use for this scenic area, should only be undertaken with great care and attention to the state of the subsurface. It would be more desirable to withdraw this land from residential use by zoning or otherwise designating it as parkland. The city cannot take any action on this matter since this land is not yet part of the city. Pressure to subdivide land near the city is strong and it is unlikely that the County of Strathcona, which includes Rabbit Hill, will take the necessary action.

Closure of the Mines Within the City:

Until damage to city property became extensive, no official concern over possible adverse effects of undermining

was expressed and some civic pride in the city's mines as well as satisfaction with the receipt of coal royalties was evident. When a firm owning blocks of coal in a five foot seam 248 feet below the surface on either side of Jasper Ave. between 91st St. and 92nd St., proposed mining the coal under Jasper Avenue, the city engineers reported that there was no danger to the surface (W.C.C.R., Jan., 1923, p. 34). The city council debated whether to let the company mine the coal and collect a royalty or whether to give the company the rights to the coal in exchange for the rights to some coal under the sewage disposal tanks. In the light of later reports, it would appear that both the coal under Jasper Avenue and the coal under the city's disposal tanks was removed.

Only five months later, in May 1923, the city was preparing an appeal to the Provincial Legislature to prohibit mining under highways without permission from the Utilities Board. The city was also contemplating legal action against the Standard Coal Co. for undermining and removing the support of the road at 76th St. and 111 Ave. A rash of pavement breaks and ruptured water mains had suddenly made the city engineers aware that undermining was not as harmless as they had believed. Public pressure was being exerted to force the closure of all mines in the city.

The Penn Mine Case:

The Penn Mine and the Chinook Mine were the two mines most involved in the dispute with the city. The Premier Mine was found liable for damages to roadways amounting to

at least $2,000 and was suspected of undermining Concordia College. The Penn Mine was working in a 128 acre lease (of 42 years duration) on the old Penitentiary property. It was working the Clover Bar coal horizon, 250 feet below the surface and it does not seem probable that this activity was the direct cause of the problem, even though the mine was not being worked in accordance with the Stirling-Drinnan-Pitcher Report (see p. 128 ). The problem in the Penn Mine area was probably due to delayed subsidence from the workings developed by the convicts in the Edmonton top seam. This possibility was recognized by city council in calling a former employee of the Penitentiary to testify to the extent of the convict mining operations (Minutes of City Council, Oct. 19, 1926, p. 226).

The Riverdale problem was due primarily to the operations of the Chinook Mine which was at this time owned by the Penn Mine Company, although other mines had worked in the same area at earlier dates. This mine was only ninety feet deep. The area involved was the Penitentiary property south of the C.N.R. tracks and including the present Exhibition Grounds. The land was owned by and leased from the federal government and jurisdiction over mining operations rested with the provincial government. The city council by itself could do nothing. A number of meetings between the Mayor of Edmonton and officials in Ottawa and between the Mayor and provincial officials including Premier Brownlee, produced no concrete results. The provincial government promised an official

enquiry but never formulated a commission, even though the city had nominated an alderman to be its representative on the commission when it should come into being. No explanation can be offered for the attitude of the provincial government. When the Urban Mining Act (Coal Mining Within City Limits) was proclaimed on Feb. 29, 1932, the two mines responsible for most of the uproar had been closed for over a year, and the only other two mines then operating within the city, the Premier and the Dawson, were not creating any problems.

When the first case was taken to court, the city was found to have no jurisdiction in the matter, and coal mining could continue. The city engineer, who had revised his opinion about the danger undermining posed to city streets, declared that twenty miles of city streets were liable to damage. This included seven miles with sewers, water mains and services laid, and 2.35 miles which were paved. At this time the coal companies were operating under 406 acres of city land and an additional 327 acres were subject to prospective mining operations (W.C.C.R., June 1925, p. 6). An engineering study, the Stirling-Drinnan-Pitcher Report, done in 1923 had recommended that the mines work fourteen foot rooms, leaving eighteen foot pillars between rooms. The pillars should be left in place when mining was completed, and a barrier of coal at least one hundred feet thick should be left between the mine workings and high water mark. The report also noted that if all the coal south of Jasper Avenue were mined, a slide would occur on the bank supporting Jasper

Avenue. It would also "be inadvisable to extend public utilities under the Penitentiary Reserve or to erect buildings on the Reserve." (Minutes of City Council, 1927, pp. 36-37). The mine operators insisted that they were complying with these recommendations but, since this meant that they could recover less than half of the available coal, it was easy to suspect that they might be drawing pillars and difficult to check the suspicion because access to worked-out areas was usually cut off by a roof fall shortly after mining was completed.

In 1926 an engineering study by J.H.A Church showed that serious damage to public utilities had occurred and could be expected to recur if undermining continued. Damage to private property was increasing and irate landowners, while taking the coal companies to court to collect damages, were demanding that action be taken to stop mining in the city entirely[3]. Since the city did not control the mineral rights, it was itself powerless and attempts to persuade the Provincial Legislature to ban mining within urban limits again failed. Another side to the situation developed when property owners in the Highlands area attempted to force the city to buy the mineral rights to their property at an inflated price by threatening to sell them to a company which

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[3] On Jan. 27, 1930 the Riverdale property owners association presented a petition to city council supporting an investigation of the subsidence problem and urging that council take whatever action was necessary to have mining banned "for the protection of both public and private property."

would start a new mine in that district. The city did not buy the mineral rights and no new mine was developed.

The problem remained active but unsolved until the fall of 1929 when the situation in the Riverdale area could no longer be ignored. Private property damage was steadily mounting, as were the complaints of the residents. The water-works superintendent and the city engineer blamed undermining for a series of water main breaks in the vicinity of Jasper Avenue and 93rd St. Ground subsidence had bent the water mains out of alignment and the strain was causing repeated leakage. The culmination of the dispute from the city's point of view, was the discovery of cracks in the walls of the final sedimentation basin at the number one sewage disposal plant. Leakage was serious enough that the basin had to be emptied, putting the plant temporarily out of service. Repairs were estimated at $1,000. At a meeting of city council on Nov. 24, 1930, City Engineer Haddow reported that damages sustained by the city due to mining subsidence amounted to $37,753 (Minutes of City Council, 1924, p. 12).

J.A.H. Church, a consulting engineer, was appointed by the city to look into the problem. As well as being consultant to the city, he was given the powers of an Inspector of Mines by the provincial government. He reported that there was ample evidence to show that subsidence of street surfaces, injury to water mains, sewers, etc., was due to mining operations. He was also of the opinion that under-

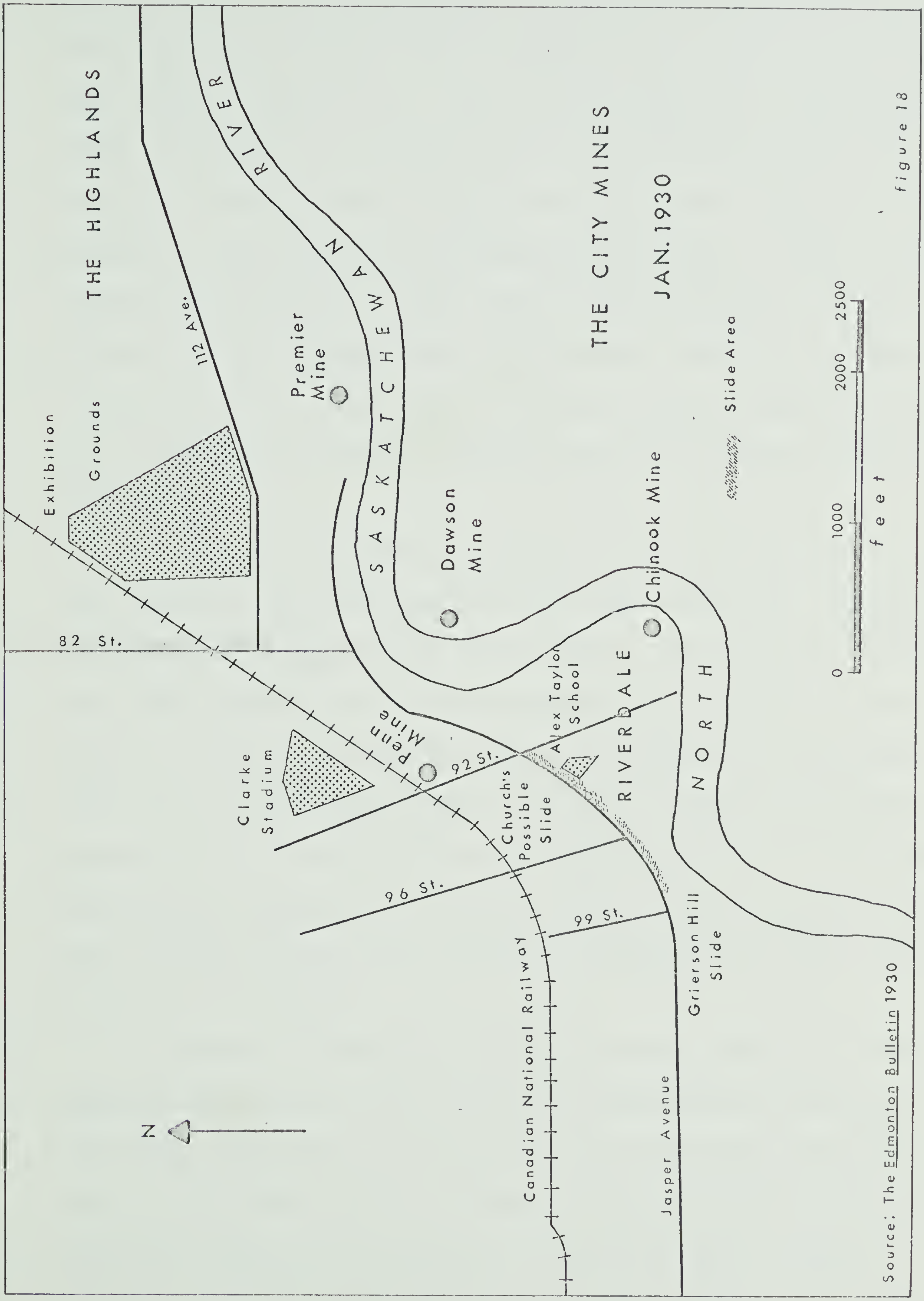


figure 18

Source: The Edmonton Bulletin 1930

mining of the toe had seriously compromised the stability of the high bank and that all buildings within 150 feet of the edge between 92nd St. and 94th St. including the Alex Taylor Public School were endangered by the possibility that the whole bank might slide. Church was the first to mention the danger of gas leaking from strained gas lines. Almost as he voiced this warning, a home was severely damaged by an explosion of gas leaking from a subsidence strained gas line. At this point the city went to court seeking damages and to the provincial government seeking power to restrict mining operations.

One consideration limiting the city's freedom of action against the mines was the fact that the mines employed a substantial number of city residents. As far back as October 1926, petitions had been presented to the city by the miners and teamsters and by some city merchants requesting "fullest consideration" before steps were taken to curtail mining (Minutes of City Council, 1926, p. 257). At this time, early in the depression, the city had no wish to add the miners to the already large number of unemployed if this were in any way avoidable.

Faced with public hostility, legal action and the possibility that the city would no longer place contracts with them, the Penn and Chinook mines were closed down in 1930. The Premier Mine continued to operate even after the Provincial Legislature passed the Act of 1932 by which

mining within a town or city limit underlying or subjacent to any street, lane or public place, was prohibited. In future, mining within urban limits could take place only after overlying highways or lanes had been discontinued from use. Mining in progress at the time the act was passed could be continued only under regulations laid down by a Board of Utility Commissioners. The Premier Mine continued to operate under these conditions until August 1937 when a fire destroyed the tipple, after which the mine was abandoned.

The Dawson Mine continued to operate until 1944. The city owned most of the surface rights and proposed to acquire what lots it did not own by exchange (Minutes of the City Council, Dec. 8, 1930, p. 24). This area was not subdivided until 1960. The Dawson was a deep mine (240 feet) and subsidence effects at the surface were minimal.

Legal action against the Penn Mine Company provided some restitution for damages to the residents of Riverdale. In addition, the provincial government awarded the sum of $12,000 to reimburse residents of Riverdale for losses on the understanding that the government was not assuming any liability and that no further action would be taken in the event of further damage occurring at a later date. The city had to decide how the money should be distributed. It appointed a valuator to look into all claims made by residents of the area. The claims of the residents totalled $58,251, while the amount of damage as assessed by the valuators amounted to $28,921.67 (Minutes of City Council, June 15,

1933, p. 213). The provincial grant was distributed on a pro-rata basis according to the findings of the valuators.

<u>Grierson Hill</u>:

The end to active mining (with the two exceptions already mentioned) did not eliminate all problems of subsidence or disturbed drainage caused by mine workings. One of the most persistent problems has been with Grierson Hill, an area of riverbank between 95th St. and 98th St. on the north side of the river. This area includes the worked out area of the old Humberstone Mine which was abandoned sometime around 1911, probably after a landslide destroyed the portal (Poppitt, p. 3)[4]. The mine plans indicate that the main drift extended north from the riverbank about five hundred feet, terminating under Jasper Avenue. The worked out area extended about one hundred feet on either side of the main drift so that a series of cavities totalling upwards of 100,000 square feet, provided a place for water to collect and saturate the surrounding area (Poppitt, p. 3). Recurrent slumping posed a danger to buildings located near the edge of the riverbank and repeatedly damaged the road leaking down to the flats. As the slumping was caused by saturation of the clay subsoil, a number of wells were sunk in the slide area. Between 1953 and 1957 an estimated three

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[4] Records in the Mines Branch pertaining to Mine No. 6 indicate that this actually happened in 1905. However there are indications that a further slide took place sometime around 1910. References in both instances are vague and further research in the <u>Edmonton Bulletin</u> did not add any information.

million gallons of water were pumped out, ninety per cent of it from the two wells in the mine area. At one well in the mine area, water could be heard rushing in. Between October 9th, 1958 and January 9th, 1959, an estimated 275,000 gallons of water were pumped from this one well (Poppitt, p. 6). Pumping out the excess water did not stabilize the hill entirely. This was finally accomplished by using impermeable landfill to seal the surface and constructing a permanent drain from the base of the slide.

The case of Grierson Hill and the Humberstone Mine proves that disturbance of the strata has residual effects long after mining has ceased.

Attitude of the City Towards the Mines:

The importance of the mines to the economy of Edmonton has been considered in Chapter IV. Unfortunately, none of the material consulted gives specific data regarding the place of the coal mines in the local economy. Their existence is mentioned only in passing, while other activities are discussed in greater detail. This might lead one to believe that the mines were unimportant, yet coal was the power source on which industry depended, directly or indirectly as in the form of electricity. The city fathers were anxious to develop an industrial base and cheap power was one of the attractions they offered[5].

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[5] This subject is considered in detail by Edmund Dale in his thesis, The Role of Successive Town and City Councils in the Evolution of Edmonton. Unpublished Ph.D. Thesis, 1969, Dept. of Geography, University of Alberta, Edmonton.

The largest single coal consumer was the city power plant. An estimate was usually made of the amount of coal which would be required for a certain period, and tenders called for. The city mines did not often submit the lowest tender.

The view of the city inhabitants as reflected in the city council was that mines within the city were "their" mines, that those in Beverly and Clover Bar, while not "theirs", were close enough to the city that awarding contracts to them was an acceptable expenditure of taxpayers' dollars, and that awarding contracts to mines at Cardiff and Morinville was spending money "outside" the area. There was a definite opinion as to which mines were "local" and which mines were "foreign". On a number of occasions representatives of the miners and the mine operators attended meetings of city council to appeal the award of a large contract to a "foreign" mine and request that special consideration be given to the local mines. For example:

> "Mr. Golics [U.M.W.A.] on behalf of local miners appeared regarding the tenders for coal supply for the Power House, requesting that the two local mines - the Premier and the Dawson - operating within the city limits be given special consideration in view of the fact of their employing citizens of Edmonton." (Minutes of City Council, 1925, p. 97)

and

> Members of city council requested information regarding the number of miners resident in the municipality and the number of ratepayers among them; the amount of taxes paid to the city by the companies tendering; the wages paid and the hours of employment. (Minutes of City Council, 1925, p. 102)

The amount involved in this case was 30,000 tons, of which 20,000 tons was finally purchased from the Canadian Coal Company at Cardiff which had submitted the lowest tender, and 10,000 was purchased locally, 5,000 tons from Edmonton mines and 5,000 tons from Clover Bar mines. On other occasions the award was given to the lowest tender, usually a mine at Cardiff or at Wabamun (Minutes of City Council, March 13, 1923; March 13, 1924), despite pleas from local operators and their employees.

Conclusion:

Relations between the city and its mines were generally amicable until the early 1920's. This did not mean that the city mines automatically obtained all the city coal contracts. Some of them, as for example the power house contract and later the relief coal contract, were too large for any one city mine to fill. They would often be split, thus increasing costs to the taxpayer. This was sometimes considered worthwhile to keep local taxpayers working.

The relationship deteriorated when the city was confronted with large repair bills for public utilities damaged by undermining. Pressure exerted by private property owners also suffering damage, left the city caught between the need to take action and the lack of power to do so. Lawsuits for damages, not legislation, forced the closure of the Penn and Chinook Mines.

Subsidence over mined-out areas is not instantaneous. Many years may elapse before settling which began a hundred

or more feet underground, becomes evident at the surface. As people forget the mining industry ever existed, they are more likely to build structures over undermined areas. The industry is most likely to be recalled to their awareness by cracks in the plaster. The owner is liable for repairs, since the province, the city and the real estate agent, all disclaim responsibility in the matter.

# CHAPTER VI

# THE EDMONTON DISTRICT COAL MINING INDUSTRY IN 1971

At the present time (summer, 1971) there are two coal mines operating in the Edmonton District: Mine No. 1626, the Star-Key Mine and Mine No. 1582, the Egg Lake Coal Company Mine. These two mines supply the remaining, mainly rural farm, coal market in north central Alberta. They are good examples of the industry as it was developed in the Edmonton District.

## The Star-Key Mine:

The Star-Key Mine, located north of Edmonton three miles west of Highway 28 on Highway 37, which has operated continuously since it was opened in 1945, is an underground operation. It was begun by Mr. J.B. Starkey, a man who was very active in the coal mining industry of Edmonton. He first became involved in the coal distributing business with the Crown Coal Company and later became a partner in a number of producing mines such as the Penn, the Chinook and the Banner before he opened up the Star-Key Mine. A limited amount of stock in this mine was issued. This stock, and therefore ownership, is now held by the mine manager, Mr. Willard Worthington, the tipple foreman, Mr. Bror Holmgren and Mrs. E.A. Starky.

### Layout of the Mine:

There are three major openings into the mine, the slope

by which the men enter and leave the mine, the hoisting shaft by which loaded cars of coal are raised from the mine to the tipple and empty cars lowered, and the air shaft through which air is forced down into the mine by means of a large fan. A fourth opening, an eighteen inch diameter drill hole some distance from the main surface installations, takes a power lead into the mine to provide power for the lights and for all the mining machinery, which is electrically powered.

The core of the mine is a main entry pillar, a block of coal 250 feet wide and extending the length of the mine, in which are driven the intake airway, the main entry and the return airway. At intervals these three main entries are joined by crosscuts which can be closed off by 'stoppings'[1] to control air circulation. These main entries are termed "face entries" because they are driven at right angles to the main cleavage plane, called the "face slip". Actual mining is done from side entries branching from the main entry at right angles. These are called butt entries because they are driven on the "butt slip" or the end of the main cleavage planes. Rooms are driven from the side entry parallel to the main entry. This set-up with respect to the cleavage planes is important in ensuring that the coal will break off cleanly and in large chunks when the explosive shots are fired.

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[1] A stopping is a barrier constructed in a crosscut to prevent air from flowing from one main passage into another (see fig. 21 ). A temporary stopping can be made of wood or brattice cloth. A permanent one, such as those used to seal off fire areas, is made of cement blocks, or, in earlier times, of clay.

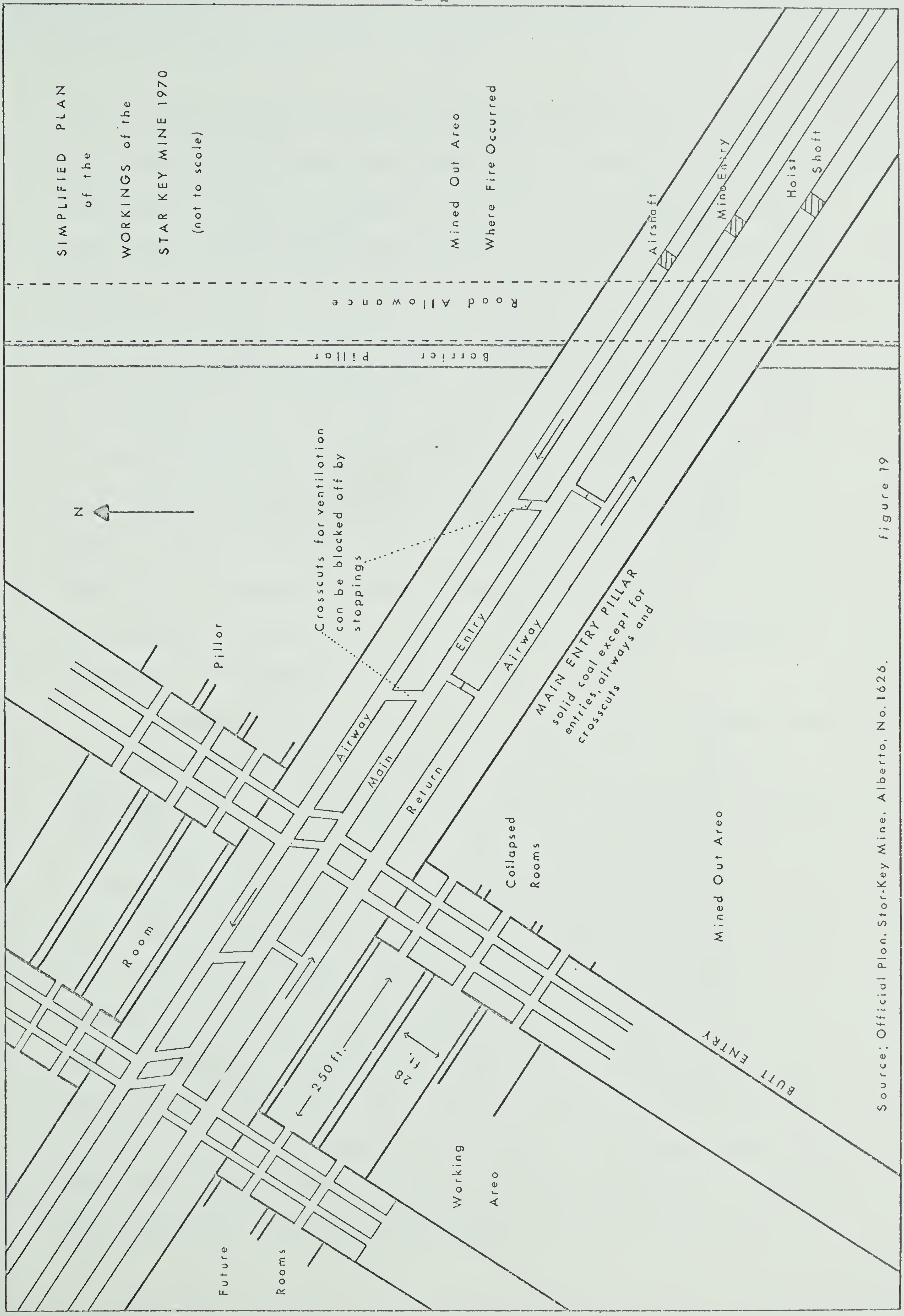


figure 19

Source; Official Plan, Stor-Key Mine, Alberta, No. 1625.

Each working room is initially cut twenty-two feet wide and about 250 feet long with the centers thirty-four feet apart. As the working face in the room is advanced, a great deal of careful timbering must be done to support the ceiling, because of the weakness of the overlying sedimentary rock in this area. As the end of each room is reached the cut is restricted so that only a narrow neck is cut through to the next entry, the entry is lengthened to the point where the neck of the next room will intersect it and the preparatory work for another room is done on the other side of the entry. Thus new development work is carried on simultaneous with regular mining operations, thereby spreading the cost of development over the entire mining operation and insuring that there are always new places ready to work.

A pillar of coal twelve feet wide exists between rooms when the room is fully extended, but a strip of this coal eight feet wide is removed by the last cut made when retreating from a worked out room. The remaining four foot pillar is not enough to support the roof which is deliberately caved by the miners instead of being left to come down later by itself. this is achieved by weakening all of the timbers supporting the roof by cutting part way through them. The difficult part is to weaken the timbers sufficiently so that the roof will collapse after and not before the miners are clear. It is preferred to bring the roof down in large sections of at least one hundred feet in length so that subsidence on the surface will be as regular as possible.

Effects of the Mine at the Surface:

The area overlying this mine is farmland and subsidence is clearly evident in the slightly rolling surface of the field, but this is not severe enough to interfere with cultivation. The owner of the surface rights has been recompensed at $100.00 per acre for possible damage. Subsidence is not even over the whole mine area because there is no subsidence over the main entry pillar or over the butt entry pillars. In the early days of mining these pillars were drawn as the last stage of working-out an area, but this is no longer done, as it is too dangerous and unprofitable. In some cases where the roof of an entry has remained intact, supported by room neck pillars, collapse of a section will produce a feature at the surface resembling a pothole.

While undermining in no way damages the overlying area for farming, except possibly to necessitate some drainage improvement work, it would be extremely unwise to subdivide this land for residential housing for a considerable period of time after mining has ceased, so as to allow most of the land to settle to a new equilibrium. Even so, it would be unrealistic for a prospective homeowner building in an area known to have been undermined to assume that no further subsidence can occur.

The area immediately adjacent to the Star-Key Mine on the east was undermined by the Samis Collieries (Mine No. 1316) which operated between 1925 and 1957. This land has now been subdivided for residential housing (Mr. W. Worthington, pers. com., August 3, 1971) even though depressions resulting from

Figure 20: Tipple and loading chutes, Star-Key Mine.

Figure 21: Subsidence caused by undermining by the Star-Key Mine.

continuing subsidence are still appearing at the surface. As yet no homes have been built on this property. Any that are built in the near future will almost certainly experience problems with cracks in foundations and walls. The attempt to develop this subdivision at the present time is most ill-advised.

Mining Technology:

The seam being worked is about seventy-two feet below the surface and averages twelve feet thick, of which seven feet are mined, the remainder being left to form a reasonably secure roof. A number of clay partings occur within the seam, two of which are important in the mining operation. The coal at the working face is undercut by a mechanical coal cutter to a depth of about seven feet. The width and depth of the cut are determined by the strength of the roof, which must be strong enough to stand unsupported while the coal brought down by the explosive is loaded out. The thickness of the cut is about five inches. A clay parting about three inches thick exists near the middle of this seam. Eight shot holes are drilled in the coal, two close together (four feet apart) near the center below the clay parting and two near the outer edges of the cut immediately above the clay band. The two center holes are fired first, then the side holes, bringing down the lower half of the block of coal and the clay parting, Then the upper holes are loaded and fired, bringing down the upper half of the block. The uppermost layer of the seam, which is of lower quality coal, is left in place to form a

roof for the entries and rooms. A crew of five men with cutter and loader working one shift per day, five days a week, takes about two months to work out a room.

The coal is loaded from the working face by means of a duckbill loader and a shaker conveyor. The conveyor can be lengthened by means of extra sections so that it will reach the length of the room when the room is fully extended. The coal is loaded into 1800 lb. capacity mine cars and hauled by battery powered locomotives to the hoisting shaft which is directly underneath the tipple. The shaft is of the double compartment type with two cages which balance each other. The weight of a loaded car going up is balanced by the weight of an empty car coming down so that the only weight actually being hoisted is the 1800 lb. of coal. Railway track is laid in the main entry and in the butt entries. When all the rooms on an entry have been worked, the track is taken up and moved to where a new entry is being developed.

The surface installation includes the mine office and weigh scales, the fan house, equipment storage and wash house, and most important, the hoist house and tipple. The mine cars are raised thirty-five feet above ground inside the tipple and dumped onto a shaker conveyor which carries the coal over a three-eighths inch screen to remove the slack, or very fine particles which drop into a bin underneath, then over a two inch screen which removes the stoker and nut sizes and a three inch screen to remove the egg size, leaving the larger pieces or lump coal to be stored in a bin at the end of the tipple.

The nut and stoker sizes are carried on a conveyor belt to the second part of the tipple which contains a rotary screen, a drum-shaped device which rotates about its major axis and includes two screens, one inside the other; the coarser nut coal remains inside the inner screen while the smaller stoker coal passes through the inner screen but is retained by the finer outer screen which passes only the second screening slack which is stored in a bin underneath. The nut and stoker grades are conveyed to their respective storage bins in the rotary screen house. Anyone wishing to purchase coal can back a truck up to the appropriate bin and load directly. Current prices are:

| | | |
|---|---|---|
| Lump | $8.50 | per ton |
| Stove | $8.00 | " " |
| Nut | $6.25 | " " |
| Stoker | $6.25 | " " |
| Slack | $4.00 | " " |

Most of those purchasing coal do their own hauling, particularly farmers in the area who have at least a half ton truck. Coal is hauled to more remote points by livestock dealers who bring a load of animals to the stockyards at Edmonton and pick up a load of coal for the return trip. The mine owns and operates one truck and has an agreement with the owner of a second truck to haul for them during the winter. A second independent trucker will also assist with hauling during particularly busy periods.

Very little coal is sold during the summer so that the coal which is brought up form the mine and cannot be accommodated in the storage bins is stored outside in piles and


figure 22

Source: Mr. W Worthington, mine manager, pers. com.

covered with slack to keep it from oxidizing.

Scale of the Operation:

An underground mine requires a great deal of capital investment, very little of which can be recovered when the mine goes out of production. A small coal producer such as the Star-Key Mine now is,[2] is an anachronism in this age where huge strip mines produce coal for industrial consumption and oil, natural gas or electricity meet most domestic requirements. This mine has been mechanized largely through salvage of equipment from other mines which were going out of production and could sell much of their equipment only for scrap. In this way the mine acquired the battery powered locomotives, replacing the horses which were used for underground haulage as recently as 1960.

After the initial development of the mine had been completed and before the failure of the coal market (i.e. around 1948), over one hundred men were employed during the winter. Production was usually between four and five hundred tons per day and on at least one occasion it reached a thousand tons per day. Now the winter crew numbers about forty. Most of these men are farmers during the summer months. During the summer about fifteen people are employed. Only one crew of five men is at work underground; the others work in the mine office or at the tipple.

The mine is a tightly run operation. It has coal re-

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[2] In 1967 the Star-Key Mine produced 40,900 tons of coal while the Whitewood Mine, the largest mine in Alberta at that time produced 1,178,000 tons (Coal Mines in Canada, 1968, p. 25).

serves to maintain production for many years. The method of mining is a rather unique hybridization of the longwall and room and pillar systems of mining which allows the best utilization of available resources under the circumstances. The factor which makes the mine's future so uncertain is the dwindling market, a variable over which the mine operator has no control. The manager estimates that the market is shrinking at about ten percent per year (Mr. W. Worthington, pers com., June 23, 1971). However this rate does fluctuate, coal sales increasing during exceptionally cold winters (eg. 1967-68).

Physical Problems Faced by an Underground Mine:

One problem for which there seems to be no solution in this case is that the longer the mine operates and the farther the workings are extended, the longer the haul to the hoisting shaft becomes, which increases the cost of production. The problem is not yet acute and may never become so. Sinking a new hoisting shaft and erecting a new tipple closer to the scene of operations is not economically justifiable under present circumstances, even if the surface rights to the necessary acreage could be obtained.

Two other problems which have confronted this particular mine as well as other mines in the district are fire and water. During the initial development of the mine, when the area of the underground workings was limited, water poured into the mine from floors walls and ceiling and continuous pumping at maximum capacity was required to keep the mine operable. Pumping still continues; four pumps in different

parts of the mine carry water to a main sump from which it is pumped out into a nearby creek. Water pumped from the mine helps to maintain the level of the creek during the winter and is welcomed by farmers downstream to provide water for their livestock. Sediment from the mine apparently settles out either in the sump or close to the discharge point. The flow of water into the mine has decreased over the years. The mine has, by continuous pumping, drawn the water table in the area down to its own level. Like a giant well, the mine may have created a 'cone of depression' extending over many acres. Another possibility is that water is accumulating in the extensive volumes of caved materials in the worked out areas, rather than flowing directly into the mine.

Fire in a coal mine is a particularly difficult problem to cope with because of the flammable nature of the mineral. It is difficult to explain why an underground fire should begin in a portion of the mine which had been worked out and had not been visited in some time. Yet such a fire did break out in some old workings near the slope and had reached the intake airway before it was discovered. Such fires result from spontaneous combustion but the manner in which this takes place in a sealed off area far underground is not understood. If the fire had become well established in the airway, the air being forced down from the surface and along this passage would have fanned it to the point where it would have taken a firm hold in the entry pillar and the mine would have been rendered unworkable. The fire was confined

within the old workings and the entries blocked off with cement block stoppings, tarred on the outer face to make them air tight. No further heating has been observed and it is hoped that the fire has died out from lack of oxygen.

It has been considered worthwhile to discuss the operation of this mine in some detail as it is typical of the majority of the mines which operated in the Edmonton District and indeed throughout most of the sub-bituminous (prairie) coal fields of Alberta. This type of mine has now nearly disappeared, to be replaced by giant stripping operations or equally large and highly complex underground operations in the mountain and foothills coal fields. It seemed proper to include an accurate description of a working model before, like the Great Auk, it becomes extinct.

The Egg Lake Coal Company:

The Egg Lake Coal Company Mine is a small strip mine located north-west of Morinville, just west of Manawan (Egg) Lake. The area involved is the north-east quarter of one section (160 acres). The operation, which has been active since 1941, consists of a number of relatively small pits, each a few acres in area, three of which or parts of which have been worked recently. One pit is south of the mine office and two are north of it; a stabilized (well vegetated) spoil bank near the west edge of the property represents a very early phase of the mine. At the time the mine was examined (July 7, 1971) heavy rains during the preceeding month had caused flooding in the pits so that in only one place was

it possible to see the top of the coal seam[3].

The coal is very close to the surface. In the north pit where the coal seam was visible, it was covered by about ten feet of silty clay overburden. In the other (south) pit which had been worked within the past year, the overburden was thicker, possibly approaching twenty feet. The accumulation of water in the pits is a normal occurrence during the spring or during wet weather and pumping before mining can begin is a regular feature of the operation.

The coal seam is not horizontal but rolls, so that the overburden is not always of the same thickness. The discontinuous nature of the mine suggests that when a dip in the coal seam or an elevation in the topography makes the overburden above a certain thickness, work is stopped in that location and a new pit started where the coal is closer to the surface.

The overburden is stripped by caterpillars and the coal is loaded into a five ton truck by a front end loader for haulage to the tipple. All of this equipment can be employed on other work, i.e. on construction jobs. In fact, a road construction contractor, North American Road Limited, owns and operates most of the equipment. The mine is a kind of subsidiary interest of the contracting firm.

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[3] 358 (1) No water shall be allowed to accumulate in a strip mine.
(2) Notwithstanding subsection (1), if the Director is satisfied that it is in the public interest to do so he may upon application permit the accumulation of water in a particular case upon such terms and conditions as he may prescribe. (Government of the Province of Alberta, The Coal Mines Regulation Act, p. 99)

Figure 23: South pit, Egg Lake Coal Co. Mine.

Figure 24: North pit, Egg Lake Coal Co. Mine. Note coal seam and piles of slack coal.

At the tipple the coal is stockpiled until it can be screened. There is a shaker screen, which separates the coal into the different grade sizes in one operation and sends them down chutes to separate storage bins. The tipple is smaller than that at the Star-Key mine, as are the storage bins, since the production of domestic grades of coal is not the main purpose of the operation.

The coal, being close to the surface is of a very inferior quality; one piece picked up at random from the waste heap showed a pattern of wood fibres still visible. Being close to the surface it is also subject to oxidation, particularly along the working cut where it is exposed directly to the air. When screened, a disproportionate amount of slack results. This slack is accumulated in piles around the tipple and during the hot summer weather there is danger that these piles will ignite by spontaneous combustion. This fine or slack coal is the major product of the mine. It is sold to construction companies and used by them to thaw the ground when excavation is required during the winter. The city of Edmonton requires eight thousand tons of this type of coal for use during the winter of 1971-72, and most of it will be supplied by this mine (Mr. W. Worthington, pers. com., Aug. 3, 1971).

The quarter section on which the mine is located has experienced considerable disturbance as a result of moving the overburden to reach the coal. No attempt has been made to level the spoil banks and they contrast quite sharply with the

Figure 25: Tipple, Egg Lake Coal Co. Mine.

Figure 26: Slack coal being used to thaw frozen ground for construction of service tunnels, University of Alberta, February, 1970.

surrounding flat or gently rolling landscape.[4] Except where there is a thick layer of slack on the surface, the spoil has a cover of weeds and grasses. The accumulation of water in the depressions attracts ducks while the mine area is something of a refuge for coyotes as this is the one place in the area where it is too rough and too dangerous for the local inhabitants to hunt them from ski-doos.

During the summer only the mine foreman, Mr. Leo Brenneis, who lives on the property, and his two sons work at the mine. During the winter five or six men may be hired.

Most of the strip mines in the Edmonton District were located in the area around Morinville and Cardiff. The Clover Bar coal horizon here is so close to the surface that it would be difficult to develop an underground mine. In some cases, homeowners have been known to dig down to the seam from their cellars and mine their own supplies (Dr. Campbell, Alberta Research Council, pers. com.). This practice is both illegal and unsafe. The old strip mines, which were never reclaimed, are clearly in evidence still. They are too hummocky to be used for farming or to be subdivided, but most of the spoil banks are naturally revegetated so that they are not visually objectionable except where the pits are being used as garbage dumps.

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[4] 112 (2) Subject to subsection (3), the land on which a strip mine is located shall be back filled and levelled as the operations progress and shall be restored as nearly as possible to its original condition.

(3) At a strip mine in a pitching seam no back filling shall be done unless the Director in writing requires or consents to the back filling. (The Coal Mines Regulation Act, p.42).

Production of Strip Mines Compared to Underground Mines:

The thin overburden consisting of unconsolidated glacial till or structurally weak shales and sandstones which overlies the uppermost coal seams in the Edmonton District, can easily be removed by modern earth moving equipment. The strip mines in the District are and always have been, small operations, in no way comparable to the strip mines which are now operating at Forestburg and Wabamun. These operators could not possibly afford to purchase large steam shovels and draglines such as those employed by the large mines, nor could they utilize them economically if they did somehow acquire them. Small strip mines utilize such equipment as bulldozers, front end loaders or possibly a shovel with a bucket capacity of three to four cubic yards. This means that the depth of overburden which small strip mine operators can economically remove is usually an average of less than forty feet. At the time when most of the strip mines were closed, there was no legislation requiring land reclamation. Although legislation has been passed now, and funds appropriated by the provincial government to reclaim abandoned strip mines (Edmonton Journal, March 8, 1955), no work of this kind has been done around Edmonton. Though shallow, the old mines are still easily recognizeable.

The first definite reference to strip mining in the Edmonton District appears in the Mines Branch Report for 1913 (p. 63);

> "A considerable amount of coal mining has also been done in the neighbourhood of Edmonton by means of the stripping process. This process is removing the surface clay by means of a steam shovel, after which the coal is quarried and loaded directly into the railway cars."

There is no information as to how many mines were employing this new technique, how much coal they were producing or where they were located. Since the Mines Branch has, on a number of occasions, changed the boundaries of the coal mining districts, they may not have been within the boundaries of the study area.

In 1921, coal from a strip mine at Tofield was giving the Edmonton mine operators stiff competition. It could load lump coal on the railway cars for $1.00 per ton (W.C.C.R., March 1921, p. 28).

In 1944 the Mines Branch included a table in the Annual Report showing the tonnage produced by strip mines separately from the tonnage produced by underground mines. This table was included in all subsequent annual reports. The table also indicates the number of men employed by each type of mine and the tonnage produced per man employed. Examination of this latter statistic makes it immediately obvious that the output per man in the strip pits has always been at least twice as high as that per man in the underground mines, although the output per man in the underground mines has shown a slow but fairly steady increase due to the increased use of mining machinery. Output per man is an extremely important consideration in an era when labour costs are an

operator's largest item of overhead.

A comparison of the output from the two types of mine in 1944, shows that one or possibly two strip mines produced fifteen thousand tons of coal while the underground mines produced almost twenty five times as much. The strip mines show a steady increase in production which reached a peak in 1950 when nine strip mines produced 182,556 tons of coal. The underground mines, after showing a substantial increase in production in the post war years of 1946 and 1947, went into a period of sharp decline until 1953 (see Table VI ). During this period a number of the underground mines were permanently closed. In 1953, the strip mines, which had declined to seven, produced nearly twice as much coal as the underground mines. The remaining underground mines maintained a constant level of output for the next twelve years until 1965 when a further period of decline began. After 1965 all but one of the underground mines closed. The strip mines maintained a near-peak level of output until 1955. Between 1955 and 1960 production from the strip mines dropped well below that of the underground mines as a number of strip mines ceased operating. Interestingly, the decline of the strip mines followed the total conversion of the city's electric generating station to natural gas. Production from the one strip mine still operating, has been between ten and fifteen thousand tons per year. Production from the one remaining underground mine is declining and is now about thirty thousand tons per year.

The development of strip mines all over Alberta as

TABLE VI

COMPARISON OF THE OUTPUT OF STRIP MINES AND UNDERGROUND MINES 1944-1969

| STRIP MINES | | | | | UNDERGROUND MINES | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date | Tons Produced | Number Employed | Output Per Man | | Date | Tons Produced | Number Employed | Output Per Man | |
| 1944 | 15,247 | 7 | 2,179 | | 1944 | 374,083 | 501 | 747 | |
| 1945 | 32,463 | 12 | 2,705 | | 1945 | 375,605 | 469 | 757 | |
| 1946 | 28,331 | 16 | 1,771 | | 1946 | 450,569 | 559 | 806 | |
| 1947 | 49,710 | 20 | 2,486 | | 1947 | 443,423 | 600 | 739 | |
| 1948 | 124,383 | 39 | 2,486 | | 1948 | 314,529 | 407 | 773 | |
| 1949 | 141,077 | 40 | 3,527 | (9 mines) | 1949 | 332,690 | 440 | 756 | (15 mines) |
| 1950 | 132,556 | 47 | 3,884 | | 1950 | 313,080 | 406 | 771 | |
| 1951 | 144,033 | 55 | 2,619 | | 1951 | 212,737 | 290 | 733 | |
| 1952 | 135,312 | 54 | 2,506 | (7 mines) | 1952 | 139,746 | 168 | 832 | (17 mines) |
| 1953 | 153,477 | 42 | 3,654 | | 1953 | 79,584 | 112 | 711 | |
| 1954 | 158,616 | 48 | 3,305 | (6 mines) | 1954 | 81,830 | 103 | 795 | |
| 1955 | 144,314 | 43 | 3,356 | (4 mines) | 1955 | 73,945 | 85 | 870 | (7 mines) |
| 1956 | 100,348 | 41 | 2,448 | | 1956 | 74,460 | 86 | 866 | |
| 1957 | 64,372 | 22 | 2,926 | | 1957 | 76,836 | 80 | 960 | |
| 1958 | 40,806 | 18 | 2,267 | | 1958 | 78,876 | 85 | 928 | |
| 1959 | 34,606 | 13 | 2,662 | | 1959 | 87,989 | 88 | 1,000 | |
| 1960 | 18,382 | 8 | 2,298 | | 1960 | 83,021 | 86 | 965 | |
| 1961 | 15,163 | 7 | 2,166 | | 1961 | 74,765 | 79 | 946 | |
| 1962 | 12,402 | 7 | 1,772 | | 1962 | 77,709 | 82 | 948 | |
| 1963 | 11,372 | 5 | 2,274 | | 1963 | 73,944 | 72 | 1,027 | |
| 1964 | 13,034 | 5 | 2,607 | | 1964 | 73,444 | 71 | 1,034 | |
| 1965 | 16,032 | 6 | 2,672 | | 1965 | 76,242 | 64 | 1,191 | |
| 1966 | 13,667 | 5 | 2,733 | | 1966 | 66,621 | 60 | 1,110 | |
| 1967 | 11,292 | 5 | 2,258 | | 1967 | 51,831 | 50 | 1,037 | |
| 1968 | 9,887 | 4 | 2,472 | | 1968 | 38,005 | 42 | 905 | |
| 1969 | 10,937 | 4 | 2,734 | (1 mine) | 1969 | 36,070 | 38 | 949 | (1 mine) |

Source: Alberta Dept. of Mines and Minerals, Mines Branch. Annual Reports, 1944-1969.

Figure 27: Abandoned, unreclaimed strip mine, Cardiff.

Figure 28: Abandoned mine on the N.A.R. line east of Cardiff.

well as in the Edmonton District was an outgrowth of the acute labour shortage which occurred toward the end of World War II, coupled with coal shortages during severe winters. Comparison of the output per man employed in strip mining and underground mining, shows that one strip miner could produce at least twice as much and sometimes five times as much coal as his underground counterpart. Both types of operation were considerably mechanized, the strip mines utilizing earth moving equipment and the underground mines employing such specialized devices as mechanical coal cutters. An underground mine now, requires as much or more capital investment than a strip mine.

It would appear that initially, lower labour costs gave the strip mines a definite competetive advantage and that their ability to sell at a lower price drove some of the underground mines out of business. The later decline of the strip mines may be accounted for in two ways. Some of the strip mines failed when the most easily accessible coal had been mined and increasing depth of overburden raised production costs. At the same time, the domestic heating and cooking market for coal declined almost to zero as gas, oil and electricity became the preferred means in all but a few rural areas. Currently the market for the two remaining mines appears to be limited to domestic heating on farms and to purchase of coal by those wishing to thaw frozen ground prior to excavation during winter construction work. This latter use was well demonstrated on the University of Alberta campus during the winter of 1970-71.

# CONCLUSION

One purpose of this study has been to determine to what extent the coal mines contributed to the development of Edmonton. The data available to this writer did not permit a quantitative evaluation of this contribution. On the other hand, the growth of the city provided an expanding market for the coal mines until coal was supplanted by natural gas and oil as energy sources. The interrelationships between the city and the coal mining industry and subsequent competition with other energy sources for heating and cooking markets have also been considered.

The Edmonton coal was easily accessible in the outcrops along the river banks, but it was of no value until settlers came into the area in substantial numbers. By itself, the coal was not a determining factor as to where settlement should take place; coal outcrops in otherwise unattractive areas (eg. Rocky Mountain House) did not give rise to permanent communities. In an area which regularly experienced longer and colder winters than most of the immigrants were accustomed to, it was a welcome bonus to good agricultural land, which was what most attracted the settlers. As long as good land remained available for homesteading, and other factors such as railway connections existed, the coal

seams gave Edmonton a slight advantage over places which lacked coal. Developing the coal resources presented an opportunity for the business men who were more interested in providing goods and services to settlers than in becoming homesteaders themselves. There soon developed within the business community a group of men who had a common interest in coal mining.

Besides having the coal available for heating, the settlers benefited from the off-season employment provided by the mines. In a predominantly agricultural community, winter is the slack season and four or five months work in the mines during the peak coal-using season could provide the homesteader with welcome cash. After the homesteading period ended, farm labourers could turn to the mines for employment when the harvest was ended. The pattern of farmer-miner in the Edmonton District held even through the decline of mining in the 1950's and is still true at the present time.

It is difficult to decide how important the mining industry was to the development of the city. In the winter, during the height of its development, coal mining provided over a thousand jobs in the immediate area and yearly produced over half a million tons of coal, worth at least two million dollars at the pit head. One dollar in 1924, the year in which the largest output was achieved, had purchasing power equivalent to at least four dollars to-day (Mr. W. Roe, Treasury Branch, Provincial Government, pers. com.),

so that in current dollars the industry was worth at least eight million dollars annually. This is without considering the requirements of the mine for power and equipment and the wages paid to the employees, the effects of which are influenced by the 'multiplier effect' which snowballs the effect of one dollar paid out by the industry in the purchase of other goods and services in the city. It seems correct to say that the coal mining industry was important, but not crucial to the economic well-being of the area.

Aside from the value of sales and wages, the mines paid royalties on the coal they produced. They also paid for the mineral rights and paid property taxes to the municipality in which the particular mine was located. Failure of a mining company could be crucial for a community, as in the case of the town of Beverly.

On the other hand, the city has paid a certain price for its coal mines. Undermining and disturbance of the strata has caused the riverbank to slide in some places, on occasion endangering property near the top of the bank. The city assumes no responsibility for damage to private property. The property owner or his insurance company must accept the loss if such occurs. Undermining has also been blamed for cracking and subsidence of roadways, fractured water and gas mains and cracks in public buildings. In most cases the tax payer has had to shoulder the cost of repairs as the mine which may have contributed to the damage, has long since gone out of business. A case in point is the old Humberstone

Mine and the stabilization of Grierson Hill.

The coal mining industry did not go into its precipitous decline until after Edmonton had become a large and well-diversified regional trade and service centre, so that its demise had much less impact than it would have had two decades earlier. In fact, the coal mining industry declined when other aspects of Edmonton's economy were booming so that it was painless in terms of unemployment, though not for individuals with an emotional attachment to the industry. With numerous more attractive opportunities for employment, it would have become difficult to maintain an adequate labour force much longer as young men would not be attracted to the mines. Some dislocation was inevitable, but it was not acute.

Sub-bituminous coal for domestic use was displaced by natural gas. It is almost certain that as long as natural gas is available at prices which are within reach of the average householder, it will remain <u>the</u> domestic fuel until new forms of energy appear. Increasing demands for natural gas, particularly by the United States, may force the price upwards unless a national fuels policy aimed at conserving Canadian natural gas for Canadian use is adopted quickly. If the price of natural gas were to increase substantially, it is entirely possible that public utilities would be converted or reconverted from gas to coal. This trend is noticeablein the construction of coal powered thermal electric generating stations at Wabamun.

Whether this type of station would be acceptable in

or near the city is debatable because of the additional air pollution it would create. There would undoubtably be some strenuous opposition but ratepayers in general usually opt for the cheapest alternative. If such a development did occur, the strippable coal reserves north of the city might become commercially significant. This again would create environmental problems and it would be extremely unwise to attempt to predict the outcome of such a situation.

The same considerations apply with much greater force if an increase in the cost of natural gas forced significant numbers of homeowners to revert to burning coal during the winter. Albertans have never experienced the effects of burning coal on a scale sufficient to heat a city the size of Edmonton; it would require some adjustment. If a general reversion to coal-fired furnaces did occur, considering the present size of the city, the local coal reserve would be insufficient to meet the demand for long, so such a situation might not revive the local industry but merely increase substantially the rail freight traffic between Edmonton and the Coal Branch.

There will not be any revival of the coal mining industry within the city limits or in immediately adjacent areas which might be annexed within the forseeable future. In these areas the best pockets of coal have already been mined. In addition, it has been demonstrated that undermining impairs land for modern development purposes, thereby reducing its value.

The two remaining mines are well outside the city. It is quite probable that these two mines will close down within the next decade. The domestic market is shrinking as natural gas service is extended into remote communities and individual farms. The construction market alone could not sustain two mines. It does not seem advisable to predict which one will close first. The underground mine is the larger producer and produces a better quality of coal but it must be operated continuously to remain workable, thereby incurring a high overhead. The strip mine on the other hand, can be abandoned for extensive periods and reactivated without much difficulty or expense. An additional imponderable is that both mines compete for the outlying market with a mine near Tofield, Alberta.

Mine operators in the Edmonton field have always complained that their profit margins were narrow, and the number of mines which went out of business whenever market conditions deteriorated would make this claim seem to be true. The reason is to be found in the over-development of the resource with respect to the market, a condition which still persists.

This study presents an overview of the coal mining industry in and around Edmonton, and as such, is by no means comprehensive. Each individual mine had its own history, and a study could be produced for any one of the larger mines. Each of the chapters of this study could have been expanded by further research and the inclusion of greater

detail. The resources available to the researcher were extensive, and limitations of time did not permit the most thorough examination possible. In particular, very little interviewing of individuals living in the area who were active in the coal mining business was done, despite repeated encouragement to do so. There is still valuable information in the files of the Mines Branch which it was impossible to absorb and utilize.

On the other hand, it was not always possible to obtain information concerning such commonplace things as the economic operating radius of a horse-powered delivery system. At the time, this information was common knowledge, so it was not recorded. Problems arose also with reliability of sources, particularly when a contradiction, or apparent contradiction developed. Sometimes this was clearly attributable to faulty recording, sometimes to differing points of view. In some cases it was impossible to determine the true state of affairs. These problems are common to all studies dealing with the imperfectly recorded past.

The growth of Edmonton was an unplanned event, attributable to site, situation and the determination of the early settlers to be an active part of the development of the prairies. The city owes its present status to a combination of favourable historical and geographical circumstances, of which mineable coal reserves was one.

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Dr. N. Berkowitz, Alberta Research Council; Director, Division of Coal Research.

Dr. J. Campbell, Alberta Research Council; Division of Coal Research.

Mr. P. Melson, Dept. of Mines and Minerals; Director, Mines Branch.

Dr. T.H. Patching, University of Alberta; Professor, Dept. of Mining Engineering.

Mr. W.L. Worthington, Manager, Star-Key Mine.

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APPENDIX "A"

REGISTERED MINES OF THE EDMONTON DISTRICT

| MINE NUMBER | NAME OF OPERATOR | LOCATION OF MINE SECTION | TOWNSHIP | RANGE | DATE MINE OPENED | CLOSED | |
|---|---|---|---|---|---|---|---|
| 4 | Ed Martin, Strathcona | 6&7 | 52 | 23 | 1897 | 1904 | |
| 5 | Robert Martin, Strathcona | RL 26 | 53 | 24 | 1897 | 1902 | |
| 6 | Wm. Humberstone, Edmonton | RL 12 | 53 | 24 | 1896 | 1905 | |
| 7 | James McAllister, Edmonton | 6&7 | 52 | 23 | 1899 | 1903 | (1) |
| 8 | F. Fudge, Clover Bar | NE¼7 | 53 | 23 | 1903 | 1922 | |
| 9 | Clover Bar Mine Coal Co., Beverly | 18 | 53 | 23 | 1897 | 1923 | |
| 10 | Edmonton Coal Co., Edmonton | RL2 | 53 | 24 | 1897 | 1904 | |
| 11 | A.J.M. Pauley, Edmonton | RL18&19 | 53 | 23 | 1898 | 1904 | (2) |
| 12 | Martin and King, Strathcona | RL 26 | 53 | 24 | 1897 | 1904 | |
| 13 | Wm. Gibbard and Ed Boutwell, Namao | SW¼17 | 55 | 24 | 1898 | 1901 | |
| 14 | Edmonton Coal Co, Edmonton | 18 | 53 | 23 | 1897 | 1923 | (3) |
| 15 | John Marsh and H. Neeb, Edmonton | RL18&20 | 53 | 24 | 189 | 1902 | |
| 16 | Mr. Talbot, Namao | SE¼17 | 55 | 24 | 1904 | 1908 | |
| 17 | R. Holloway, Strathcona | Big Island | | | 1899 | 1899 | |
| 18 | Ramsey and George, South Edmonton | RL23 | 52 | 24 | 1897 | 1907 | |
| 19 | Messrs Marreau and Polleau, Edmonton | RL18&19 | 53 | 23 | 1897 | 1902 | (4) |
| 20 | Elliot and Louisberg, Edmonton | no location | | | 1897 | 1898 | |
| 21 | W. Pepper, Edmonton | 18 | 53 | 23 | 1897 | 1904 | (5) |
| 22 | Mortimer Bros., Edmonton | RL18&19 | 53 | 23 | 1897 | 1903 | (6) |
| 23 | Mr. Trimble, Edmonton | 6&7 | 52 | 23 | 1897 | 1903 | (7) |
| 24 | Big Island Coal Co., Strathcona | 20 | 51 | 25 | 1897 | 1934 | |
| 25 | J. Banach and M. Hoynak, Strathcona | south side Sask. River | | | 1897 | 1899 | |
| 26 | Robert Bailey, St. Albert | no location | | | 1897 | 1898 | |
| 27 | Gough and O'Neill, St. Albert | Sturgeon River | | | 1896 | 1898 | |
| 28 | Stewart and Campbell, Namao | NE¼8 | 55 | 24 | 1896 | 1898 | |
| 29 | H.W. Smith, South Edmonton | 25 | 51 | 25 | 1897 | 1948 | |
| 32 | Cardiff Coal Co., Cardiff | 24 | 55 | 25 | 1902 | 1930 | |

| MINE NUMBER | NAME OF OPERATOR | LOCATION OF MINE SECTION | TOWNSHIP | RANGE | DATE MINE OPENED | CLOSED | |
|---|---|---|---|---|---|---|---|
| 33 | Bearce, Morrison and Pike, Strathcona | NE¼7 | 53 | 23 | 1897 | 1901 | (8) |
| 43 | W. and A. Thomson (Humberstone), Beverly | 7 | 53 | 23 | 1899 | 1934 | |
| 44 | Elia Carpenter, St. Albert | SW¼17 | 55 | 24 | 1897 | 1899 | |
| 45 | J. Baldwin, Edmonton | no location | | | 1900 | 1905 | |
| 46 | Bush Mine Coal Co. Ltd., Beverly | RL42 | 53 | 23 | 1905 | 1925 | |
| 47 | Strathcona Coal Co., Strathcona | RL9 | 52 | 24 | 1905 | 1911 | |
| 49 | McPeak Coal Co., Edmonton | RL29 | 53 | 24 | 1905 | 1923 | |
| 50 | Edmonton Coal Co. Ltd, Edmonton | RL20 | 53 | 24 | 1901 | 1905 | (9) |
| 51 | M.E. Ransome, Edmonton | RL42 | 53 | 23 | 1901 | 1906 | |
| 52 | Mays Coal Co., Edmonton | 7 | 53 | 23 | 1901 | 1902 | |
| 60 | E.D. Martin, Strathcona | RL23 | 52 | 24 | 1902 | 1904 | |
| 65 | Omer Gouin, Morinville | 24 | 55 | 25 | 1902 | 1904 | |
| 66 | Messrs Bishopric and Grierson, Edmonton | RL23 | | | 1902 | 1904 | (10) |
| 67 | Gallagher and Hull, Edmonton | no location | | | 1902 | 1903 | |
| 68 | Evans and Robinson, Edmonton | RL25 | 53 | 24 | 1902 | 1905 | |
| 69 | Keith and Fulton, Clover Bar | 7 | 53 | 23 | 1902 | 1937 | |
| 73 | Hames Martin, Strathcona | no location | | | 1903 | 1904 | |
| 74 | Milner and Shoeman, Clover Bar | 7 | 53 | 23 | 1903 | 1913 | |
| 75 | Charlse Rich, Namao | 16 | 55 | 24 | 1903 | 1917 | |
| 79 | Edmonton Coal Co. Ltd., | 18 | 53 | 24 | 1903 | 1904 | (12) |
| 85 | James Stewart, Edmonton | no location | | | 1903 | 1904 | |
| 89 | The Great West Coal Co., Ltd, Edmonton | 7 | 53 | 23 | 1903 | 1904 | |
| 90 | Fraser - McKay Collieries Ltd., Clover Bar | 8 | 53 | 23 | 1904 | 1940 | |
| 91 | Ottewell Coal Co., Clover Bar | SW¼17 | 53 | 23 | 1904 | 1951 | |
| 93 | John Cameron, Edmonton | RL18 | 53 | 24 | 1904 | 1906 | |
| 95 | R. Willis, Edmonton | RL35 | 53 | 24 | 1905 | 1905 | |
| 96 | H. Twyford, Edmonton | SW½6 | 53 | 23 | 1904 | 1907 | |
| 97 | R. Ransone, Leduc | no location | | | 1905 | 1905 | |
| 98 | Byers Bros., Edmonton | NW¼8 | 53 | 23 | 1905 | 1906 | (13) |

| MINE NUMBER | NAME OF OPERATOR | LOCATION OF MINE SECTION | TOWNSHIP | RANGE | DATE MINE OPENED | CLOSED |
|---|---|---|---|---|---|---|
| 99 | Great West Coal Co. Ltd., Clover Bar | 6&7 | 53 | 23 | 1903 | 1952 |
| 101 | W. Dickinson & W. Knight, Namao | 9 | 55 | 24 | 1905 | 1928 |
| 102 | John Wilson, Leduc | no location | | | 1904 | 1905 |
| 109 | Harper Coal Co., Edmonton | RL22 | 53 | 24 | 1906 | 1910 |
| 110 | Murdock Sutherland, Namao | 4 | 55 | 24 | 1906 | 1911 |
| 122 | Wetaskiwin Coal Co., Strathcona | 20 | 51 | 25 | 1906 | 1907 |
| 125 | Ketchum Coal Co., Edmonton | NW¼7 | 53 | 23 | 1906 | 1910 |
| 127 | Larry Garneau Jr., Edmonton | RL7&9 | 52 | 24 | 1907 | 1908 |
| 128 | Rosedale Coal Co., Edmonton | RL28&30 | 53 | 24 | 1907 | 1909 |
| 129 | Sundance Mines Ltd., Cardiff | 24 | 55 | 24 | 1907 | 1909 (14) |
| 141 | Namao Coal Co., Namao | W½3 | 55 | 24 | 1907 | 1909 |
| 147 | Penn Mines Ltd., Edmonton | RL18, Fraser's Flats | | | 1907 | 1930 |
| 148 | Western Coal Ltd., Edmonton | RL31 | 53 | 24 | 1907 | 1915 |
| 155 | Dawson Coal Ltd., Edmonton | RL25 | 53 | 24 | 1907 | 1944 |
| 156 | Rupert's Land Coal Co., Oliver | 11 | 54 | 24 | 1907 | 1908 |
| 164 | Belmont Coal Co., Edmonton | SW½24 | 53 | 23 | 1908 | 1908 |
| 177 | Donkin & Stevens Co. (Twin City) South Edmonton | SW¼32 | 52 | 24 | 1908 | 1921 |
| 178 | Porte and Co., Namao | SE¼8 | 55 | 24 | 1908 | 1917 (15) |
| 182 | Raymond Coal Co., Edmonton | 27 | 53 | 23 | 1908 | 1908 |
| 196 | H. Speers, Namao | NE¼8 | 55 | 24 | 1909 | 1914 |
| 221 | Riviere Qui Barre Coal Co. | SE¼30 | 55 | 26 | 1910 | 1913 |
| 237 | Banner Coal Co. Ltd., Cardiff | 24 | 55 | 25 | 1910 | 1923 |
| 267 | North American Collieries Ltd., St. Albert | NW¼28 | 53 | 25 | 1911 | 1916 |
| 283 | The Great West Coal Co., Ltd., Edmonton | SW¼6 | 53 | 23 | 1911 | 1915 |
| 351 | Legal Coal Co., Legal | SW¼25 | 57 | 25 | 1912 | 1945 |
| 369 | J.H. Petrie, Strathcona | 28 | 51 | 25 | 1912 | 1913 |
| 386 | Cameron Bros., Namao | SW¼17 | 55 | 24 | 1913 | 1915 |
| 389 | William Smith, St. Albert | 8 | 55 | 24 | 1913 | 1935 |

| MINE NUMBER | NAME OF OPERATOR | LOCATION OF MINE SECTION | TOWNSHIP | RANGE | DATE MINE OPENED | CLOSED |
|---|---|---|---|---|---|---|
| 397 | Sparrow and Kelly, Namao | SE$\frac{1}{4}$8 | 55 | 24 | 1913 | 1929 |
| 420 | Clarke and Davis, Namao | SE$\frac{1}{4}$8 | 55 | 24 | 1913 | 1915 |
| 428 | Banner Coals Ltd.,(Kelston Collieries) Carbondale | 8 | 55 | 24 | 1914 | 1951 |
| 442 | W. & G. Williscroft, Namao | SE$\frac{1}{4}$3 | 55 | 24 | 1914 | 1915 |
| 632 | Penn Mines Ltd., Edmonton | RL20 | 53 | 24 | 1915 | 1930 |
| 633 | Kent, Johnson and Whitford, Bon Acord | NE$\frac{1}{4}$17 | 56 | 23 | 1916 | 1918 |
| 645 | D. Gwilliam, Namao | SW$\frac{1}{2}$6 | 55 | 24 | 1916 | 1918 |
| 682 | Gottleb Wedman, Strathcona | 6 | 51 | 25 | 1917 | 1918 |
| 699 | Marcus Coals Ltd., Edmonton | 8 | 53 | 23 | 1917 | 1940 |
| 707 | Bush Mines Ltd., Beverly | RL40 | 53 | 24 | 1917 | 1944 |
| 720 | E. Rudolph & A.B. Bailey (Rudolph's Mine), Edmonton | NW$\frac{1}{4}$5 | 51 | 25 | 1917 | 1932 (16) |
| 721 | Worthington & Cunningham, S. Edmonton | 29 | 51 | 25 | 1917 | 1918 |
| 741 | Sugars, Jackson & Ring, Edmonton | 7 | 53 | 24 | 1918 | 1918 |
| 753 | Dickinson and Knight, Carbondale | 8 | 55 | 24 | 1918 | 1943 |
| 773 | McGuire Collieries, Edmonton | RL2 | 53 | 24 | 1918 | 1919 |
| 797 | Fred Gutche, Strathcona | SE$\frac{1}{4}$8 | 51 | 25 | 1919 | 1919 |
| 798 | Pete Pawlina, S. Edmonton | 35 | 50 | 26 | 1919 | 1923 |
| 837 | Kuhnert and Hiller, S. Edmonton | SW$\frac{1}{2}$6 | 51 | 25 | 1919 | 1924 |
| 865 | J.H. Farnell, Big Island | 29 | 51 | 25 | 1920 | 1923 |
| 868 | Dominic Falvo, Strathcona | 28 | 51 | 25 | 1920 | 1929 |
| 869 | Edina Coal Co. Ltd.,(Premier) Edmonton | RL26 | 53 | 24 | 1920 | 1937 |
| 877 | Thomas Nearney | NW$\frac{1}{4}$25 | 51 | 25 | 1920 | 1925 |
| 886 | I. Sereda, Leduc | 26 | 50 | 27 | 1921 | 1927 |
| 888 | Pearson and Branton, Calmar | 36 | 50 | 27 | 1921 | 1937 |
| 890 | Melvin Smalley, Redwater | 22 | 57 | 21 | 1921 | 1921 |
| 892 | J. Ordza and I. Thomas, Edmonton | RL25 | 53 | 24 | 1921 | 1922 |

| MINE NUMBER | NAME OF OPERATOR | LOCATION OF MINE SECTION | TOWNSHIP | RANGE | DATE MINE OPENED | CLOSED | |
|---|---|---|---|---|---|---|---|
| 922 | D. Falvo, Strathcona | 28 | 51 | 25 | 1921 | 1927 | |
| 926 | J.A. Magwood, Morinville | NE¼36 | 56 | 26 | 1921 | 1924 | |
| 933 | J.M. Quebec, S. Edmonton | 29 | 51 | 25 | 1921 | 1923 | |
| 939 | Arndt, Lengert & Schultze, Edmonton | 11 | 54 | 24 | 1921 | 1924 | |
| 943 | Belmont Coal Co. Ltd., Edmonton | 11 | 54 | 24 | 1921 | 1922 | |
| 950 | Fred Hook, Leduc | 6 | 51 | 25 | 1921 | 1927 | |
| 1006 | G.W. Clarke, Namao | SW¼4 | 55 | 24 | 1922 | 1923 | |
| 1022 | Fridel Coal Co., Edmonton | 25 | 51 | 25 | 1922 | 1931 | |
| 1034 | Volinski, Yaniciv, & Maik, S. Edmonton | 25 | 51 | 25 | 1922 | 1949 | (17) |
| 1052 | J. Raymond, Edmonton | RL38 | 53 | 24 | 1922 | 1923 | |
| 1059 | W. Collins, Strathcona | NW¼25 | 51 | 25 | 1922 | 1923 | |
| 1087 | John Mather, Beverly | RL40 | 53 | 24 | 1923 | 1924 | |
| 1091 | W.E. Gibb, South Edmonton | NE¼26 | 51 | 25 | 1923 | 1940 | (18) |
| 1098 | Long Coal Co. Ltd., Namao | 31 | 54 | 24 | 1923 | 1954 | (19) |
| 1099 | Knife Coal Co. Ltd., Leduc | W½12,6 | 51 | 25 | 1923 | 1936 | |
| 1104 | Thomas Mather, Edmonton | NE¼36 | 52 | 24 | 1923 | 1925 | |
| 1113 | Charles Morris, St. Albert | RL42 | 54 | 25 | 1923 | 1924 | |
| 1123 | Chapin Terris, Graminia | 31 | 50 | 26 | 1923 | 1923 | (20) |
| 1144 | E. Williams, Leduc | NE¼8 | 51 | 25 | 1924 | 1924 | |
| 1167 | Messrs. G. & H. Booth, Beverly | 18 | 53 | 23 | 1924 | 1942 | |
| 1168 | H.A. McKen & J.E. Seale, St. Albert | block A | 53 | 26 | 1924 | 1925 | |
| 1177 | Steve Poholko, Strathcona | NW¼25 | 51 | 25 | 1925 | 1925 | |
| 1197 | Graf & Shand, Cardiff | SW¼24 | 55 | 25 | 1925 | 1934 | |
| 1229 | Mrs. Taylor & W. Miller, Bon Acord | 3 | 56 | 24 | 1936* | 1941 | |
| 1233 | Mike Sinoski, Strathcona | 25 | 51 | 25 | 1926 | 1946 | |
| 1235 | W. Fridel, Strathcona | NW¼7 | 51 | 24 | 1926 | 1926 | |
| 1253 | Herman Keen, Leduc | 36 | 50 | 26 | 1926 | 1928 | |
| 1256 | W. Fridel, Strathcona | 30 | 51 | 24 | 1927 | 1927 | |
| 1266 | Black Gem Coal Co. Ltd., Namao | 36 | 54 | 25 | 1927 | 1965 | |

| MINE NUMBER | NAME OF OPERATOR | LOCATION OF MINE SECTION | TOWNSHIP | RANGE | DATE MINE OPENED | CLOSED | |
|---|---|---|---|---|---|---|---|
| 1277 | Waclaw Fridel, Edmonton | 13 | 52 | 25 | 1928 | 1928 | |
| 1285 | Bulet & Sapelak, Strathcona | 25 | 51 | 25 | 1928 | 1930 | |
| 1297 | Ellerslie Collieries, Strathcona | 26 | 51 | 25 | 1929 | 1935 | |
| 1316 | Samis Collieries Ltd., Namao | 36 | 54 | 25 | 1925 | 1957 | |
| 1321 | Roberts Coal Co., Cardiff | 24 | 55 | 25 | 1930 | 1939 | |
| 1352 | Riddock & Horkulak, Strathcona | 26 | 51 | 25 | 1931 | 1946 | |
| 1357 | Red Hot Coal Co. Ltd., Edmonton | RL33 | 53 | 24 | 1931 | 1951 | |
| 1366 | Beverly Coal Co. Ltd., Beverly | 13 | 53 | 24 | 1931 | 1951 | |
| 1389 | Deep Seam Coal Syndicate, Edmonton | SE¼28 | 53 | 24 | 1932 | 1934 | |
| 1393 | Ottewell Coal Co., Clover Bar | 36 | 52 | 24 | 1932 | 1950 | |
| 1395 | Thomas Mather, Edmonton | 24 | 54 | 25 | 1932 | 1939 | |
| 1403 | Sprucedale Colliery, Leduc | 6 | 51 | 25 | 1932 | 1934 | |
| 1419 | S. Fridel & Opalinski, S. Edmonton | 25 | 51 | 25 | 1933 | 1954 | (21) |
| 1427 | Kent Coal Co. Ltd., Edmonton | SW¼30 | 52 | 23 | 1933 | 1945 | |
| 1429 | Hulbert, Wilson & Severson, Namao | NE¼30 | 54 | 24 | 1933 | 1934 | |
| 1437 | Independent Coal Co., Nisku | 6 | 51 | 25 | 1933 | 1934 | |
| 1438 | Marshall Coal Co., Leduc | 6 | 51 | 25 | 1933 | 1937 | |
| 1462 | Joseph Pickard, S. Edmonton | 25 | 51 | 25 | 1934 | 1939 | |
| 1463 | Riverside Coal Co. Ltd., Edmonton | 5 | 55 | 24 | 1934 | 1956 | (22) |
| 1476 | Dickinson, Knight & Dickinson, Carbondale | NW¼9 | 55 | 24 | 1935 | 1945 | |
| 1477 | Seneczko & Gorski, Ellerslie | 25 | 51 | 25 | 1935 | 1937 | |
| 1492 | John May, Edmonton | 25 | 51 | 25 | 1936 | 1945 | |
| 1496 | G.S. Gwilliam, Namao | 6 | 55 | 24 | 1936 | 1953 | (23) |
| 1528 | George W. Smith, Edmonton | 1 | 51 | 26 | 1937 | 1939 | |
| 1530 | Brehm Coal Co., Leduc | 35 | 50 | 26 | 1937 | 1939 | |
| 1535 | McLean Coals Ltd., Edmonton | 24 | 51 | 24 | 1938 | 1938 | |
| 1537 | Nugent Coal Co., South Edmonton | 26 | 51 | 25 | 1938 | 1939 | |
| 1550 | George Burnham, Edmonton | 29 | 51 | 25 | 1938 | 1940 | |

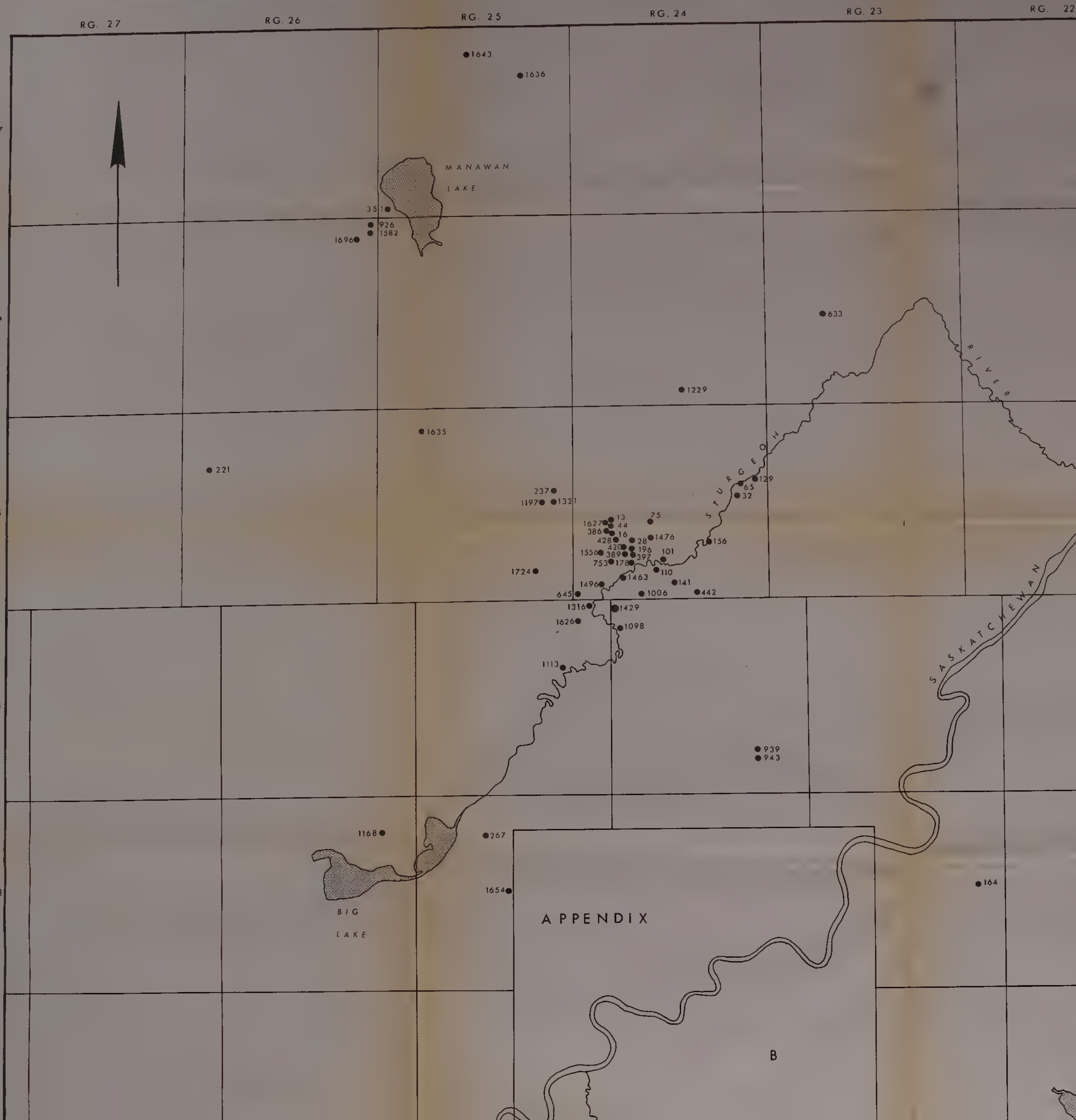
| MINE NUMBER | NAME OF OPERATOR | LOCATION OF MINE SECTION | TOWNSHIP | RANGE | DATE MINE OPENED | CLOSED | |
|---|---|---|---|---|---|---|---|
| 1556 | William Ryan, Edmonton | 7 | 55 | 24 | 1939 | 1939 | |
| 1558 | Roxy Coal Co., Edmonton | 6 | 51 | 25 | 1939 | 1941 | |
| 1559 | John G. Mucha, S. Edmonton | 25 | 51 | 25 | 1939 | 19 | |
| 1560 | K. Nimko, Edmonton | 25 | 51 | 25 | 1939 | 1954 | |
| 1561 | D.O. Roberts, Edmonton | 23 | 51 | 25 | 1939 | 1941 | |
| 1582 | Egg Lake Coal Co. Ltd., Morinville | NE¼36 | 56 | 26 | 1941 | open | |
| 1594 | John G. Mucha, S. Edmonton | 25 | 51 | 25 | 1943 | 1946 | |
| 1626 | Star Key Mines Ltd., Carbondale | 35 & 36 | 54 | 25 | 1945 | open | |
| 1627 | Dickinson, Knight & Dickinson Carbondale | SW¼17 | 55 | 24 | 1945 | 1954 | (24) |
| 1628 | Blue Point Mine, S. Edmonton | 23 | 51 | 25 | 1945 | 1954 | (25) |
| 1632 | C.F. MacLachlan, Edmonton | 2 | 53 | 21 | 1945 | 1955 | |
| 1635 | Morinville Collieries Ltd., Cardiff | 32 | 55 | 25 | 1945 | 1957 | |
| 1636 | Chiarello, Chiarello & St. Martin, | 26 | 57 | 25 | 1945 | 1951 | (26) |
| 1641 | Andrew Horkulak, S. Edmonton | 26 | 51 | 25 | 1946 | 1958 | |
| 1643 | Cherrille Bros., Edmonton | SE¼33 | 57 | 25 | 1946 | 1946 | |
| 1946 | J.G. Mucha, S. Edmonton | 25 | 51 | 25 | 1946 | 1948 | |
| 1654 | Acme Brick Co. Ltd., Edmonton | NE¼21 | 53 | 25 | 1946 | | (27) |
| 1658 | T. Opalinske & Klapstein, Ellerslie | 25 | 51 | 25 | 1947 | 1954 | |
| 1679 | J.B. Little & Sons Ltd., Edmonton | RL20 | | | 1893 | | (28) |
| 1684 | Hohn G. Mucha, S. Edmonton | 25 | 51 | 25 | 1948 | 1957 | |
| 1696 | Adelard Houle, Morinville | 36 | 56 | 26 | 1949 | 1955 | (29) |
| 1724 | Banner Coals Ltd., Edmonton | 2,13,15, | 55 | 25 | 1951 | 1955 | (30) |
| 1727 | Red Hot Coals Ltd., Edmonton | 13 | 52 | 25 | 1957 | 1970 | |
| 1750 | A. Horkulak, S. Edmonton | 25 | 51 | 25 | did not operate | | |

(1) same location as mine no. 4
(2) changed to Messrs. Gerad and Fortin
(3) consolidated with mine no. 9
(4) changed to Messrs. Gerad and Fortin; same location as mine no. 11
(5) same location as mine no. 14
(6) same location as mine no. 11
(7) same location as mine no. 4
(8) same location as mine no. 8; changed to Pearce and Davis
(9) penitentiary property
(10) same location as mine no. 32; changed to Messrs. Chevigny and Steffas
(11) same location as mine no. 18
(12) same location as mine no. 14
(13) consolidated with mine no. 90
(14) re-opened 1945; 1907 location given as SW$\frac{1}{2}$3, twp. 55 range 24, crossed out
(15) consolidated with mine no. 397
(16) re-opened 1950, abandoned 1954; re-opened again June 8, 1960, abandoned 1968
(17) changed to Black Point Coal
(18) changed to Rabbit Hill Collieries
(19) changed to Mike Vitaly
(20) J.E. and J.A. McKinnon, re-opened 1948, abandoned 1950
(21) changed to Pine Creek Collieries Ltd.
(22) changed to Riverdale Coal Ltd.
(23) changed to Gwilliam and Samis
(24) changed to Beverly Ltd.
(25) abandoned 1954
(26) changed to J.B. St. Martin
(27) file no. changed to Q5 in 1951
(28) file no. changed to Q1 in 1951
(29) mine re-opened Oct. 9, 1956, abandoned Oct. 21, 1958
(30) abandoned May 10, 1955
(31) 1970 changed to Whitemud Creek Coal Co. Ltd.

* date given, 1936, probable typographical error; from the sequence it should read 1926

LOCATIONS APPROXIMATE ONLY
INDUSTRIAL
AIRPORT
EXHIBITON
GROUNDS
CLARKE
STADIUM
NORTH SASKATCHEWAN RIVER
MILL CREEK
WHITEMUD CREEK
U of ALBERTA
UNIVERSITY FARM
City Boundary
Township 53
Township 52
Range 25
Range 24
Range 23
1500 0 3000 6000
Feet
1366
1167
79
21
91
9
14
125
43
8 & 33
98
52
69
90
89
74
699
1052
1087
707
46
51
99
96
283
1104
1393
1427
741
109
869
5
12
128
1357
155
68
148
49
95
892
1679
632
6
93
147
15
10
773
11 & 19 & 22
60
18
66
177
127
47
50
1389
1277
1727
23
7
4

# APPENDIX C


RG. 27
RG. 26
RG. 25
RG. 24
RG. 23
RG. 22
TP. 57
TP. 56
TP. 55
TP. 54
TP. 53
MANAWAN LAKE
BIG LAKE
STURGEON RIVER
SASKATCHEWAN
APPENDIX B
1643
1636
351
926
1582
1696
633
1229
1635
221
237
1197
1321
13
44
16
1627
386
428
420
389
1556
753
178
196
397
28
1476
75
101
110
156
129
65
32
1463
1496
141
442
1006
645
1724
1316
1429
1626
1098
1113
939
943
1168
267
1654
164